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UNIVERSITY ASSOCIATES

Final Project Impact Report

TECHNICAL APPENDICES

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Submitted To:

Boston Redevelopment Authority

Proponent:

University Associates
Boston, MA

Prepared By:

Fort Point Associates
M/V Chelsea
300 Congress Street
Boston, MA 02210
(617) 357-7044

As of November 1991

APPENDICES

Appendix A	Circulation List
Appendix B	Correspondence and Meeting Minutes
Appendix C	History of Boston University Medical Center
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APPENDIX D

APPROVALS AND AGREEMENTS

Certificate of Design Approval

South End Landmarks District Commission

BOSTONIA CONDITA AD 1630

City of Boston
The Environment Department

Raymond L. Flynn
Mayor

Lorraine M. Downey
Director

Boston City Hall/Room 805
Boston, Massachusetts 02201
617/725-4416 or 725-3850

Mr. Robert F. Walsh
University Associates Limited Partnership
Robert Walsh and Associates
307 West First Street
Boston, MA 02127

NOTICE OF DECISION CERTIFICATE OF DESIGN APPROVAL
Application #91.219SE
640-710 Albany Street

Dear Mr. Walsh,

At a meeting held in Boston City Hall on October 1, 1991 the South End Landmark District Commission reviewed your application for a Certificate of Design Approval relative to the multi-phase construction of six structures, including a parking garage, a research building, three combined office/research buildings, and a hotel on Albany Street within the South End Harrison/Albany Protection Area. The commission voted to approve Phase I of the construction: a parking garage and a single research building.

In its discussion, the commission noted that the project is located at the furthest edge of the Protection Area. Reviews within the protection area are intended to evaluate impacts on the adjacent landmark district. The commission determined that the proposed Phase I construction represented an improvement to Albany Street, and a minimal impact on the landmark district. The commission encouraged the efforts of the design team to develop a project which addresses the architectural character of the area while accommodating a complex and technical program.

The commission noted that the approval applies to phase I only. The applicant must return to the commission for review as subsequent phases are developed and finalized. This determination is based on the understanding that no zoning variances are required.

This determination is based solely on documentation presented at the hearing. Statutory reviews by other agencies in conflict with this decision may affect the status of this certificate. The applicant is responsible for notifying the commission of any changes to this proposal, and failure to do so will invalidate this certificate. This certificate is valid for two years from date of issue. Photographs of the completed project should be submitted to this office to establish compliance with this certificate. Please bring a copy of this certificate with you when filing for permits from the Inspectional Services Department (1010 Massachusetts Avenue, Boston).

Thank you for your cooperation.

Sincerely,

Diana E. Prideaux-Brune
Secretary
South End Landmark District Commission

cc: Alan Schwartz
Gerald Kavanaugh
John Merkler

Vote on Application 92.219SE
Motion by PISANI Second by O'DONNELL
AFFIRMATIVE: Neale, O'Donnell, Pisani, Plant, Schwartz, Wilson
NEGATIVE: (none)

BRA Resolutions RE: Planned Development Area 41

Master Plan
Development Impact Project Plan
Planned Development Area Plan

Master Plan/Development Impact Plan - PDA No. 41

Site Description
Project Plans
List of PDA Uses
Parking Plan and Memorandum Of Understanding - Universtiy Associates and Public Facilities (Parking)

Development Plan for Technology Square Garage - PDA No. 41

Development Plan for the Center for Advanced Biomedical Research - PDA No. 41

RESOLUTIONS OF THE BOSTON REDEVELOPMENT AUTHORITY REGARDING THE UNIVERSITY ASSOCIATES/ SOUTH END TECHNOLOGY SQUARE PROJECT PLANNED DEVELOPMENT AREA MASTER PLAN, DEVELOPMENT IMPACT PROJECT PLAN AND PDA DEVELOPMENT PLANS

SEPTEMBER 26, 1991

1. THE ONGOING BRA APPROVAL PROCESS

WHEREAS, University Associates Limited Partnership (the "Applicant") has requested from the Boston Redevelopment Authority (the "BRA") and the Boston Zoning Commission (the "Commission") approval of (a) a master plan (the "Master Plan") and a development impact project plan (the "DIP Plan") (together, the "Master/DIP Plan") for a Planned Development Area to be designated for an approximately 8.5 acre site at 624-710 Albany Street (Urban Renewal Parcel 46B), Boston, Massachusetts (the "Site") in connection with a proposed mixed-use development (the "Project"), (b) a development plan (the "Center Development Plan") for the Center for Advanced Biomedical Research (the "Center") to be developed by the Trustees of Boston University within said Planned Development Area, and (c) a development plan (the "Garage Development Plan") for the Technology Square Garage (the "Garage") to be developed by the Applicant within said Planned Development Area (the Center Development Plan and the Garage Development Plan and sometimes collectively referred to as the "Development Plans"). The Applicant is a Massachusetts limited partnership to be formed, the general partners of which will be Univer Development Foundation, Inc., a Massachusetts non-profit corporation, and the Trustees of Boston University, a Massachusetts non-profit, educational corporation, its successors and assigns.

Under Section 3-1A(a) of the Boston Zoning Code (the "Code"), a planned development area may be established by a master plan for any area that is not less than 5 acres and is not located in a residential zoning district (the "Master Plan Threshold Criteria"). Since the Site is currently located in H-3 and M-2 zoning districts, the Applicant is petitioning the Boston Zoning Commission to change the zoning in both of said districts to B-4 (the "Initial Zoning Change"). Accordingly, the approval of the Master/DIP Plan, the Development Plans and the BRA Agreements hereinafter set forth is subject to the accomplishment of the Initial Zoning Change, whereupon the BRA finds that the Master Plan Threshold Criteria will be met.

A master plan for a planned development area establishes general parameters of development permitted in the project area and ensures the provision of certain public amenities. Pursuant to Section 3-1A(a) of the Code, a master plan must set forth "a statement of the development concept, including the planning

objectives and character of the proposed development, the proposed uses of the area, the range of dimensional requirements contemplated for each of the proposed uses, the proposed phasing of construction of the development" (collectively the "Master Plan Criteria").

Before any work may proceed within a planned development area established on the basis of a master plan, there must be a development plan for the area in which work will proceed that establishes specific development limits and ensures the provision of certain public benefits therein. Pursuant to Section 3-1A(a) of the Code, a development plan must "set forth the proposed location and appearance of structures, open spaces and landscaping, proposed uses of the area, densities, proposed traffic circulation, parking and loading facilities, access to public transportation, [and] proposed dimensions of structures" (collectively, the "Development Plan Criteria").

Similarly, Sections 26-3 and 26B-3 of the Code establish requirements for a development impact project, and Sections 26-2.2 and 26B-2.2 require that a development impact project plan contain the same information as a development plan, and, in addition thereto, a development impact project plan must also set forth the projected number of employees (collectively, the "DIP Plan Criteria"). The Master Plan Criteria, Development Plan Criteria and the DIP Plan Criteria are sometimes collectively referred to as the "Plan Criteria."

The Master/DIP Plan, the Center Development Plan and the Garage Development Plan submitted by the Applicant to the BRA represent a crucial stage in the planning process for the Project. Without BRA approval of the Master/DIP Plan and the Development Plans, the Applicant cannot proceed to the final stage at which the final plans and specifications are submitted to the BRA for final development review approval and certification as to consistency with the Master/DIP Plan. If the BRA determines that the Master Plan meets the Master Plan Criteria, and that the Center Development Plan and the Garage Development Plan meet the Development Plan Criteria, and that they "conform to the general plan for the city as a whole and that nothing in such plan will be injurious to the neighborhood or otherwise detrimental to the public welfare," the BRA may, after public hearing, approve the Master Plan, the Center Development Plan and the Garage Development Plan. Section 26A-3 of the Code similarly provides that no DIP plan may be approved by the BRA without making the same determinations as required for the Master Plan.

As noted above, even after the Master/DIP Plan, the Center Development Plan and the Garage Development Plan are approved, the BRA review process will continue. All drawings and specifications will be subject to development review and approval by the BRA. In addition, in order to obtain a building permit

for the Center or the Garage, all final plans and specifications must be submitted to the BRA for a determination that they are consistent with the Master/DIP Plan and the applicable Development Plan. If the final plans and specifications are not consistent with the Master/DIP Plan or the applicable Development Plan, they cannot be approved unless the Master/DIP Plan and the applicable Development Plan are amended, after public notice and hearing.

2. THE PRESENT SITE IS SIGNIFICANTLY UNDERUTILIZED AND UNDERDEVELOPED

WHEREAS, the Site is designated as Parcel 46B within the South End Urban Renewal District of Boston. The front of the Site faces on Albany Street and the rear of the Site abuts the Massachusetts Avenue Connector, a viaduct linking the Southeast Expressway with Massachusetts Avenue. The Site is bordered on the sides by the Boston City Hospital power plant and the wholesale flower distributors. The Site contains approximately 8.5 acres. (A more precise description of the Site is contained in the Master/DIP Plan.) The Site is undeveloped and open. It is presently used by Boston City Hospital and Boston University Medical Center for surface parking. Consequently, the Site returns little to the City in terms of tax revenue, and nothing in terms of employment or other public benefits.

The BRA finds that, if the Master/DIP Plan and the Development Plans are not approved, the Site will continue as an underutilized area; and that the existing character of the Site will remain essentially unchanged; and the potential public benefits from the Site will not be fully realized.

3. THE APPLICANT'S MASTER/DIP PLAN

WHEREAS, the Master/DIP Plan consists of 17 pages of text plus attachments designated as Exhibits A through D. The Center Development Plan consists of 12 pages of text plus attachments designated as Exhibits A and B. The Garage Development Plan consists of 11 pages of text plus attachments designated as Exhibits A and B. In addition, the Applicant has submitted proposed forms of a Development Impact Project Agreement and a Cooperation Agreement (collectively, the "BRA Agreements"). After reviewing these forms of agreements, the BRA is satisfied that the BRA Agreements will ensure compliance with the Master/DIP Plan, the Center Development Plan and the Garage Development Plan and the provision of the public benefits and mitigation measures referred to herein and, with such changes as may be made thereto by the Director of the BRA, the Director of the BRA will execute the BRA Agreements in a timely manner.

The BRA finds that the Applicant's Master/DIP, the Center Development Plan and the Garage Development Plan adequately set forth the required elements of the Plan Criteria under Sections

3-1A(a), 26-2.2 and 26B-2.2 of the Code, including the proposed location and appearance of structures, open-spaces and landscaping, proposed uses of the Site, densities, proposed traffic circulation, parking and loading facilities, access to public transportation, proposed dimensions of structures and projected number of employees.

4. THE PROJECT

WHEREAS, the Project contemplates a mixed use development planned to include primarily medical research, medical office, research/office, retail and daycare space, a parking garage and a hotel. The Project will consist of six structures: the Garage, consisting of a 1,000 car parking garage with daycare and retail space on the ground level; the Center, consisting of one 180,000 square foot medical research building; two 160,000 square foot medical office/research buildings (the "Medical Arts Building" and the "Medical Office/Research Building"); one 140,500 square foot research/office building ("Research/Office Building"); and a 240 room hotel with a 180 seat restaurant ("Hotel"). The Project also includes extensive landscaping and infrastructure improvements. The Garage will not exceed 80 feet in height (except for elevator and stairway penthouse structures) on a footprint of 44,000 square feet. The Center will not exceed 144 feet in height (except for a 28 foot mechanical penthouse structure) on a footprint of 20,000 square feet. The Medical Arts Building will not exceed 110 feet in height on a footprint of 20,000 square feet. The Medical Office/Research Building and the Research/Office Building, respectively, will not exceed 110 feet in height on a footprint of 20,000 square feet. The Hotel will not exceed 100 feet in height on a footprint of 27,000 square feet.

The BRA finds that the development of the Site is critically important to the revitalization of the South End. The BRA further finds that by maximizing the use of the presently underutilized Site, the Project will provide for the long-term needs of the Boston University Medical Center for expanded and upgraded medical research and office space.

The BRA finds that, from a design standpoint, the Project is in harmony with the design philosophy of the South End, that massing and setbacks are coordinated to relate to those of the surrounding neighborhood and the area, and that the buildings in the Project will have heights and gross floor areas not in excess of those permitted in the Master/DIP Plan.

5. THE PUBLIC REVIEW PROCESS AND EVOLUTION OF THE PROJECT

WHEREAS, the Project is the result of a comprehensive community review process within the South End community over a nine month period. Through monthly and bimonthly meetings, the community has actively reviewed Project proposals and requested

alternatives thereto. Specifically, the design of the Center and Garage, affirmation of environmental safety procedures associated with hazardous waste, provisions for employment training, neighborhood improvements, and transportation management and mitigation measures have been made and address during the Project's review. In addition, throughout the review process, the Project has evolved to include the provision of substantial community benefits as set forth in Resolution No. 7 below.

As part of the public review process, a Project Notification Form was filed on November 16, 1990 with the BRA and a combined Draft Project Impact Report and Draft Environmental Impact Report (the "DPIR/DEIR") was filed on May 15, 1991 with the BRA. An Environmental Notification Form was filed in February, 1988 with the Massachusetts Executive Office of Environmental Affairs ("the EOEA"), and a DPIR/DEIR was filed with EEOC on May 15, 1991.

The BRA finds that as a result of the process of citizen involvement and public review, numerous changes have been made in the Project, demonstrating the Applicant's sensitivity to design, aesthetics, community concerns, environmental impacts and scale. The BRA further finds that, out of this public review, and through the diligent and good faith cooperation of the Applicant, the Project represents a culmination of the combined needs of the City, the Applicant and the community at large.

6. THE PROJECT CONFORMS TO THE "GENERAL PLAN FOR THE CITY AS A WHOLE"

WHEREAS, in approving a development plan or a development impact project plan, the BRA must find "that such plan conforms to the general plan for the City as a whole." No specific "general plan" is referred to in Sections 3-1A, 26-3 or 26B-3 or elsewhere in the Code.

On March 11, 1965, the BRA adopted as the official master plan of the City for the next decade the "1965/1975 General Plan for the City of Boston and the Regional Core" (the "1965-1975 Plan"). In the intervening years, no other formal City-wide plan has been adopted, although other plans and studies have been conducted, including the BRA study entitled "Planning for Boston's Next Decade of Development 1980-90." Neither the 1965-1975 Plan, nor any other single document frozen in time, has constituted "the general plan" for the City. Rather, "the general plan for the City as a whole" has been a continually evolving concept, evidenced by development precedents and existing zoning ordinances.

The BRA finds that, by turning an underutilized site in the South End into a mixed-use development, the Project will convert an underdeveloped site into a physical and financial asset, and will provide economic stimulus to the neighborhood and the larger community. The BRA further finds that by using materials and

designs which are harmonious with the surrounding neighborhood, the Project will strengthen the South End area without compromising the historic and architectural integrity of the area. The BRA further finds that, in spite of Boston's greatly changed condition since the adoption of the 1965-1975 Plan, the Project, as set forth in the Master/DIP Plan, the Center Development Plan and the Garage Development Plan are consistent with the development concepts contained in the 1965-1975 Plan.

7. THE PROJECT IS NOT "INJURIOUS TO THE NEIGHBORHOOD OR OTHERWISE DETRIMENTAL TO THE PUBLIC WELFARE"

WHEREAS, in order to approve the Master/DIP Plan, the Center Development Plan and the Garage Development Plan the BRA must find that "nothing in a proposed Planned Development Area plan will be injurious to the neighborhood or otherwise detrimental to the public welfare" pursuant to Section 3-1A(a) of the Code. This standard has been interpreted by the Supreme Judicial Court in Manning v. Boston Redevelopment Authority, 400 Mass. 444 (1987). As the court noted, the planned development area provisions of the Code were intended to "establish a more flexible zoning law" in order to encourage well-planned and thoroughly reviewed large scale private development projects on underutilized sites. These provisions contemplate a balancing of relative benefits and burdens, acknowledging that such large scale development projects inevitably cause some burdens, but realizing that in a well-conceived and well-designed project such burdens are outweighed by public benefits generated by the Project.

Based upon its consistent administrative practice for nearly two decades, as well as upon the mandate of Manning, the BRA will balance a proposed plan's possible adverse affects and other matters claimed to be detrimental to the public welfare against the benefits to the neighborhood, the City, and the public. It will approve only those plans which "on balance, are not injurious to the neighborhood or otherwise detrimental to the public welfare, weighing all the benefits and burdens."

With respect to this Project, the balance is tipped heavily in favor of benefits to the neighborhood, the City and the public. As an integral part of the development review process, revisions have been made to the Project's design in order to mitigate adverse environmental and other impacts. In addition, through the public review process, the Applicant has included in the Project substantial community benefits designed to minimize any potential adverse impacts of the Project. These examples demonstrate a significant amount of mitigation included in the current Project design, which has resulted in a limited potential for negative impacts.

The Project provides numerous positive impacts. Set forth below are some of the benefits which will inure to the public as

a result of the Project.

Public Benefits

A. Open Space Use

A landscaping and paving plan for the Site includes the creation of a pedestrian plaza which will serve to maximize views to and from the South End as well as to contribute to the boulevard character for the new Massachusetts Avenue Connector. Landscaping will be noted for its rich vocabulary in pavers, plantings, lighting, signage and other street furniture throughout the Site. The pedestrian plaza will include a combination of grass, large and small trees in a geometric pattern which will be coordinated with building entrances. Water features and benches are also integrated into the pedestrian plaza design. Additionally, plans contemplate a planting buffer zone between the buildings and the present Massachusetts Avenue Connector, as well as additional plantings upon the relocation of the Massachusetts Avenue Connector after the depression of the Central Artery. During the first phase of the project, the pedestrian plaza has one expanse approximately 60 feet wide and 400 feet long to the rear of the buildings along Albany Street and another expanse approximately 80 feet wide and 140 feet long between the Center and the Medical Arts Building. Upon completion of the first phase, the total pedestrian plaza area will be approximately 32,000 square feet. Upon the completion of the second phase, the pedestrian plaza is extended between the Medical Office Research Building and the Research/Office Building by an expanse approximately 80 feet wide and 120 feet long, increasing the total open space area to approximately 42,000 square feet within the pedestrian plaza area and another 2 acres of landscaped open space along the perimeter of the Site and the Massachusetts Avenue Connector. Further, the Master/DIP Plan contemplates that if the Central Artery/Tunnel project redesigns the Massachusetts Avenue Connector as a new, on grade access road, and the resulting additional area is incorporated into the Site, with the increase in land, one or more Project buildings could be placed in the southeast corner of the expanded Site, and the pedestrian plaza behind the Medical Arts Building could be expanded by as much as 20,000 square feet, which would increase the total pedestrian plaza area to as much as approximately 62,000 square feet.

B. Employment Plan

It is anticipated that the Project will generate approximately 2,600 construction jobs over the entire life of the Project and provide approximately 2,275 permanent jobs.

The Applicant will execute a Boston Residents Construction Employment Plan, a Memorandum of Understanding and a First Source Agreement in connection with the Project as more particularly

described in the Cooperation Agreement.

In addition, the Applicant will work with the Mayor's Office of Jobs and Community Services to make employment and training opportunities available to both South End employers and residents. The primary focus of this program will be on jobs available in the biomedical research field and on specific job categories presently unfilled in the educational and medical institutions located in the South End area.

C. Increased Tax/PILOT Revenues

It is anticipated that the Project will make significant economic contributions to the City by generating additional property tax/PILOT revenues.

D. Development Impact Project Contribution

It is presently estimated that pursuant to Article 26 of the Code, the Applicant will contribute approximately $3,676,300 in housing linkage payments, or cause the creation of low and moderate income housing of an equivalent value. It is also anticipated that, pursuant to Article 26B of the Code, the Applicant will make jobs linkage contributions totalling approximately $725,000.

E. Daycare Space

The Project will provide new daycare space for approximately 100 children. This facility will be available largely to employees of the Project and the medical facilities in the area; however, one-third of such 100 spaces will be made available to South End residents and employees of Boston City Hospital.

F. Cooperation Agreement

The benefits described above are described in more detail in the Cooperation Agreement to be executed by the Applicant and the BRA.

G. Other Benefits

The Project will insure continuation and strengthening of existing public benefits to the City and the neighborhood from the operation of the Boston University Medical Center and University Hospital. This Project is unique in the extent of public benefits in that it will ensure the continuation, strengthening and expansion of existing medical research institutions in the area. By developing the underutilized Site, the Project will enhance the neighborhood and the community at large by providing job opportunities, healthcare and education.

8. THE PROJECT SATISFIES THE CRITERIA FOR PDA EXCEPTIONS

WHEREAS, in order for the Board of Appeal of the City of Boston to grant certain exceptions with respect to the floor area ratio, setbacks, certain other dimensional features of the Project, uses, and other requirements in accordance with Section 6A-3 of the Code, it must find that (1) each requested exception is "in harmony with the general purpose and intent" of the Code; (2) each requested exception is in conformity with the Master/DIP Plan and the applicable Development Plan, and that the BRA has so certified; and (3) the Project complies with the Development Impact Project requirements of the Code.

The BRA finds that, for reasons set forth in the Resolutions numbered 5, 6 and 7 above, and based upon a review of the Applicant's Master/DIP Plan, the Center Development Plan, the Garage Development Plan, and the BRA Agreements, the above-stated criteria are satisfied as to each of the exceptions listed in the Master/DIP Plan, the Center Development Plan and the Garage Development Plan (the "Zoning Requests"). Pursuant to Section 6A-1 of the Code, such exceptions relate to work in a planned development area of not less than 5 acres and, therefore, shall not lapse and become null and void provided, within two years after the record of the Board of Appeal's proceedings pertaining thereto is filed with the Building Commissioner pursuant to Section 8 of Chapter 665 of the Acts of 1956, the Authority files with the Building Commissioner a certificate that work within the planned development area has commenced and is diligently proceeding, and provided further that the Authority does not thereafter file with the Building Commissioner a certificate that such work is not diligently proceeding.

9. CONCLUSION

WHEREAS, the BRA gave due and proper notice of a public hearing, to be held in the Board Room of the BRA on September 26, 1991, to consider the Master/DIP Plan, the Center Development Plan and the Garage Development Plan, and to determine the manner in which Sections 3-1A, 26-3 and 26B-3 should be applied to the Master/DIP Plan, the Center Development Plan and the Garage Development Plan. The public hearing was duly convened and held in all respects in accordance with law, and to the extent required by law, with a legal quorum present throughout the meeting. A legally sufficient number of members of the BRA voted in a proper manner and all other requirements and proceedings under law incident to the proper adoption or the passage of said vote have been duly fulfilled, carried out and otherwise observed. At the public hearing, the BRA heard extensive testimony from a number of witnesses and closed the public hearing and the public record with respect thereto on September 26, 1991.

Based on all this evidence, the BRA finds and concludes that

the urban design elements of the Project reflect the needs of the South End, while respecting the public goals and guidelines established for development in Boston and that the Project will aid the City financially by generating jobs, by providing health care services and by providing Boston with a new source of real estate tax/PILOT revenues and linkage funds.

Based on all the evidence, the BRA further finds and concludes that the Project's Master/DIP Plan, the Center Development Plan and the Garage Development Plan satisfy all applicable Plan Criteria and otherwise comply with Section 3-1A and Articles 26 and 26B of the Code.

Based on all the evidence, the BRA further finds and concludes that the Project's Master/DIP Plan, the Center Development Plan and the Garage Development Plan "conform to the general plan for the City as a whole."

Based on all the evidence, the BRA weighs this Project's public benefits against the combined detriments of this Project and further finds and concludes that the Master/DIP Plan, the Center Development Plan and the Garage Development Plan are not "injurious to the neighborhood or otherwise detrimental to the public welfare."

Based on all the evidence, the BRA finds that the exceptions listed in the Zoning Requests satisfy all of the criteria of the Code.

10. RESOLVES

NOW THEREFORE be it resolved by the Authority

That in connection with the Master/DIP Plan, the Center Development Plan and the Garage Development Plan presented at a public hearing duly held at the offices of the Authority on Thursday, September 26, 1991, and after consideration of (i) evidence presented at, and in connection with, the hearing, and in connection with the proposed Project described in the Master/DIP Plan, the Center Development Plan and the Garage Development Plan, (ii) matters discussed in a memorandum dated September 26, 1991 from the Authority Staff to the Authority and Stephen Coyle, and (iii) the findings of the Authority set forth above, which evidence, memorandum and findings are incorporated herein by reference, the Authority finds that (1) the Master/DIP Plan, the Center Development Plan and the Garage Development Plan conform to the general plan for the city as a whole; (2) nothing in the Master/DIP Plan, the Center Development Plan or the Garage Development Plan will be injurious to the neighborhood or otherwise detrimental to the public welfare; and (3) the Master/DIP Plan, the Center Development Plan and the Garage Development Plan do

adequately and sufficiently satisfy the Plan Criteria and all other criteria and specifications for a development plan and for a development impact project plan as set forth in the Code, subject to obtaining the Initial Zoning Change; and further

That the form and substance of the Master/DIP Plan, the Center Development Plan and the Garage Development Plan and the procedures employed in reviewing and approving the Master/DIP Plan, the Center Development Plan and the Garage Development Plan conform with the requirements of the Code as applied to a development plan for a planned development area under Section 3-1A of the Code and a development impact project plan under Articles 26 and 26B of the Code; and further

That the Authority hereby waives any procedural requirements of the Authority's "Zoning Procedures for the Master Plan/ PDA" dated March 19, 1986 with which the application submitted by the Applicant, for a planned development area subdistrict designation for the parcel of land which is the subject of the Master/DIP Plan, is not in conformity, and for which the review and approval procedures undertaken in connection with such application were not in conformity; and further

That pursuant to the provisions of Section 3-1A and Articles 26 and 26B of the Code, the Authority hereby approves the Master/DIP Plan, the Center Development Plan and the Garage Development Plan, subject to the Initial Zoning Change. The Master/DIP Plan is embodied in a written document entitled "Master Plan and Development Impact Project Plan for Planned Development Area No. ___ South End Technology Square," dated September 10, 1991 consisting of 17 pages of text plus attachments designated Exhibits A through D, and is attached hereto at Tab 4. The Center Development Plan is embodied in a written document entitled "Development Plan for Center for Advanced Biomedical Research within Planned Development Area No. ___, South End Technology Square," dated September 10, 1991 consisting of 12 pages of text plus attachments designated Exhibits A and B, and is attached hereto at Tab 5. The Garage Development Plan is embodied in a written document entitled "Development Plan for Technology Square Garage within Planned Development Area No._____ South End Technology Square," dated September 10, 1991 consisting of 11 pages of text plus attachments designated Exhibits A and B, and is attached hereto at Tab 6. The Master/DIP Plan, the Center Development Plan and the Garage Development Plan shall be on file at the office of the Assistant Director for Neighborhood Planning and Zoning of the Authority; and further

That the Authority hereby authorizes the Director of the

Authority to petition the Zoning Commission of the City of Boston (the "Commission") for a planned development area subdistrict designation for the Site which is the subject of the Master/DIP Plan, and to recommend to the Commission that it approve such petition, the Master/DIP Plan, the Center Development Plan and the Garage Development Plan, pursuant to Section 3-1A of the Code; and further

That the Authority hereby approves the proposed forms of the BRA Agreements in substantially the forms attached hereto at Tabs 7 and 8, respectively, and the Authority hereby authorizes and directs the Director of the Authority to execute and deliver in the name of and on behalf of the Authority the BRA Agreements, with such changes as he, in his discretion, shall determine to be necessary or desirable, his execution and delivery of any of the foregoing or the taking of any such action to be conclusive evidence of his determination and of the authority granted to him hereunder. The BRA Agreements shall be on file in the office of the Authority; and further

That pursuant to Section 6A-2 of the Code, the Authority hereby authorizes the Director of the Authority to recommend to the Board of Appeal approval of the proposed zoning exceptions set forth in the Master/DIP Plan, the Center Development Plan and the Garage Development Plan, with such changes as the Director of the Authority, in his discretion, shall determine to be necessary or desirable, his taking of any such action to be conclusive evidence of his determination and of the authority granted to him hereunder; which approval of such exceptions is recommended by the Authority provided that the Commission will have adopted a Map Amendment designating the land involved as a B-4-D zoning district. The Authority hereby authorizes the Director of the Authority to certify to the Commission and the Board of Appeal that said exceptions are in conformity with the Master/DIP Plan and the Center Development Plan and the Garage Development Plan, as the case may be. Pursuant to Section 6A-1 of the Code, such exceptions relate to work in a planned development area of not less than 5 acres and, therefore, shall not lapse and become null and void provided, within two years after the record of the Board of Appeal's proceedings pertaining thereto is filed with the Building Commissioner pursuant to Section 8 of Chapter 665 of the Acts of 1956, the Authority files with the Building Commissioner a certificate that work within the planned development area has commenced and is diligently proceeding, and provided further that the Authority does not thereafter file with the Building Commissioner a certificate that such work is not diligently proceeding; and further

That the Authority hereby authorizes and directs the Director of the Authority to execute and deliver in the name

of and on behalf of the Authority all agreements and documents incidental to the Master/DIP Plan, the Center Development Plan and the Garage Development Plan, such agreements and documents to be on such terms and conditions as the Director deems appropriate and in the best interests of the Authority, his execution and delivery of such agreements or documents or the taking of any such action to be conclusive evidence of his determination and of the authority granted to him hereunder. Any such agreements and documents shall be on file in the office of the Authority; and further

That the Authority hereby authorizes the Director to certify in the name of the Authority that the plans to be submitted to the Commissioner of the City of Boston Inspectional Service Department in connection with the Master/DIP Plan, the Center Development Plan and the Garage Development Plan are in conformity with the Master/DIP Plan, the Center Development Plan and the Garage Development Plan, respectively, his certification of such to be conclusive evidence of his determination and of the authority granted to him hereunder; and further

That the Authority hereby authorizes the Director of the Authority to certify to the Commission that the Project complies with the Development Review Requirements of the Code, his certification of such to be conclusive evidence of his determination and of the authority granted to him hereunder; and further

That, conditioned upon execution of a Transportation Access Plan with the Boston Transportation Department, and a Boston Resident Construction Employment Plan, a Memorandum of Understanding and a First Source Agreement with the Mayor's Office of Jobs and Community Services, the Authority hereby authorizes the Director of the Authority to certify to the Building Commissioner pursuant to Section 6A-1 of the Code that work within the planned development area has commenced and is diligently proceeding, his certification of such to be conclusive evidence of his determination and of the authority granted to him hereunder.

MEMORANDUM SEPTEMBER 26, 1991

TO: BOSTON REDEVELOPMENT AUTHORITY AND
STEPHEN COYLE, DIRECTOR

FROM: LINDA MONGELLI-HAAR, ASSISTANT DIRECTOR FOR
NEIGHBORHOOD PLANNING AND ZONING
THOMAS O'MALLEY, ASSISTANT DIRECTOR FOR
NEIGHBORHOOD HOUSING AND DEVELOPMENT
GERRY KAVANAUGH, DIRECTOR OF INSTITUTIONAL PLANNING
MICHAEL HUNTER, DEPUTY DIRECTOR FOR NEIGHBORHOOD
PLANNING AND ZONING

SUBJECT: UNIVERSITY ASSOCIATES/SOUTH END TECHNOLOGY SQUARE (SETSA) PROJECT: PLANNED DEVELOPMENT AREA MASTER PLAN AND DEVELOPMENT IMPACT PROJECT PLAN FOR 624-710 ALBANY STREET; A DEVELOPMENT PLAN FOR THE CENTER FOR ADVANCED BIOMEDICAL RESEARCH AT 700 ALBANY STREET; AND A DEVELOPMENT PLAN FOR TECHNOLOGY SQUARE GARAGE AT 710 ALBANY STREET.

EXECUTIVE SUMMARY: This memorandum requests that with regard to the University Associates/South End Technology Square Project, the Boston Redevelopment Authority (1) make findings for the approval of, and approve a Planned Development Area Master Plan and Development Impact Project Plan and two PDA Development Plans for the South End Technology Square Development project; and (2) authorize the Director to make all actions and to execute all documents deemed necessary and appropriate for the development of the South End Technology Square site. Specific conditions are subject to the terms and conditions outlined in the attached resolutions.

Introduction

University Associates Limited Partnership, a Massachusetts limited partnership to be formed, the partners of which will be the Trustees of Boston University and Univer Development Foundation, Inc., requests approval of a Planned Development Area Master Plan and Development Impact Project Plan

and two PDA Development Plans for the South End Technology Square development project. The primary planning objective of University Associates for the development of the site is to create an integrated and coordinated program of education, research and health care in cooperation with the Boston University Medical Center. This planning objective is consistent with the "South End Urban Renewal Plan" which was adopted by the City of Boston on December 6, 1965. The South End Urban Renewal Plan had as one of its primary objectives the promotion of industry, commerce, and institutions in appropriate locations and the provision of appropriate sites for the necessary expansion of medical, institutional and industrial facilities. The approval of this project will further this objective and will be in conformity with the South End Urban Renewal Plan.

Site Description

The Proposed Project will be constructed on approximately 372,593 square foot parcel of land located between Albany Street and the Massachusetts Avenue Connector, and between the so-called Flower Market building on Albany Street and the power generation plant of Boston City Hospital.

Master Plan for Planned Development Area

The Proposed Master Plan includes the construction of a total of 810,000 gross square feet of space in five buildings, in addition to a 1,000 space structured parking garage. Specifically, the Master Plan proposes to construct one 180,000 square foot medical research building, one 140,500 square foot

medical/office/research building, two 160,000 square foot medical/office/research buildings, a 250-room hotel comprised of 166,000 square feet, and one 1,000 car parking structure. The proposed parking structure would also contain child care and retail space on the ground level, and all buildings along Albany Street would contain retail uses on the ground floor. The Master Development Plan will allow for the creation of a major medical research center for the establishment of research laboratories affiliated with the medical institutions in the South End.

Development Plan for Center for Advanced Biomedical Research

A Development Plan has been submitted for the first phase of the Master Plan to allow for the construction of a 180,000 square foot medical research building at 700 Albany Street, which will be known as the Center for Advanced Biomedical Research. The building will be nine stories in height with a mechanical penthouse above the roof, and will include 6,600 square feet of retail space fronting onto Albany Street. This building will be the catalyst for other medical research and laboratory buildings within the site and will make a significant contribution to the prominence of Boston as a national leader in the biomedical research economy. Construction of the research building is anticipated to begin in the fourth quarter of 1991, with completion anticipated in late 1993.

Development Plan for Technology Square Garage

A second Development Plan has been submitted for the first phase of the Master Plan for the development of a 1,000

space parking garage at 710 Albany Street. The parking garage will contain approximately 370,800 square feet of floor area with seven (7) levels of parking, ground level retail space, and a child care center for 100 children. Construction of the parking facility would begin in the second quarter of 1992 and will be completed in early 1994.

Project Phasing

It is anticipated that the proposed Master Plan will be implemented in two phases, with several sub-phases within each phase.

Phase I will include the construction of the proposed 180,000 square foot biomedical research building, the 1,000 space parking garage, and the 140,500 square foot medical arts building. Construction of the medical research building is anticipated to begin in October, 1991, with completion in December, 1993. Construction of the parking garage is anticipated to begin in the second quarter of 1992, with completion anticipated in early 1994. Construction of the medical arts building is anticipated to begin in late 1992, with completion in late 1994.

Phase II is contemplated to begin in early 1996, with the total project to be completed in the year 2000.

Boston Civic Design Commission Review

The Proposed Project is subject to review by the Boston Civic Design Commission ("BCDC"). The BCDC voted to make the following recommendations with respect to the Master Plan for

the South End Technology Square Project on September 3, 1991, with the following recommended modifications: 1) to maximize the public accessibility of the East Newton Street Extension (such as allowing public access); 2) to provide public access to the central campus open space through the hotel; and 3) to modify the future buildings and open space fronting the Massachusetts Avenue Connector to improve the public realm along that corridor. The BCDC recommendations affect the Phase II elements of the Project, and such recommendations are contingent upon the relocation of the present Massachusetts Avenue Connector as a result of the Central Artery Project and the incorporation of additional land area within the Site. The BCDC voted not to review the buildings in Phase I due to the advanced stage of the design, but would like to review the schematic design for the landscape plan.

Community Review

The Proposed Project is the result of a comprehensive community review process within the South End community over a nine month period. Through monthly and bi-monthly meetings, the community has actively reviewed the proposal and requested alternatives to the plan. Specifically, changes in the design of the research building and the garage, affirmation of environmental safety procedures associated with hazardous waste, provisions for employment training, neighborhood improvements, and transportation management and mitigation measures have been made

and addressed during the Project's review. The public benefits of the Proposed Project are defined below.

Public Benefits

The Proposed Project will generate a number of public benefits to the City of Boston and local community.

a. Economic and Fiscal Benefits

With a total development cost of approximately $300 million, the proposed plan represents a significant investment in the Boston health care and research economy. In addition, the project will generate a significant increase in local property taxes (or payments-in-lieu-of taxes) and state taxes. Approximately $4 million in property taxes or payments-in-lieu-of-taxes is expected to be generated, and additional revenue to the state in the form of sales and hotel taxes will be generated.

b. Employment Benefits

The Proposed Project is expected to generate 2,600 construction jobs over the life of the project. The developer has agreed to comply with the City's hiring policies and will execute a Boston Residents Construction Employment Plan Agreement with the Mayor's Office of Jobs and Community Services (OJCS).

The Proposed Project will also generate 2,275 permanent jobs. The developer has agreed to execute a First Source Agreement regarding local hiring, and will offer job

training assistance to local residents for the employment opportunities defined above.

c. Linkage

The Proposed Project will generate a total of approximately $3,676,500 in housing linkage funds, with a single deduction of 100,000 square feet over the entire project. The proposal will also generate approximately $725,300 in jobs linkage funds. The developer has agreed to work with the local community to create new job training initiatives which will provide the South End community and its residents with the necessary training to obtain the permanent employment opportunities to be created.

d. Day Care

The Proposed Project includes the establishment of a child care facility with an enrollment capacity of 100. One-third of the enrollment will be reserved for BCH employees and community residents.

e. Environmental Safety

Because of the nature of the proposed uses, the local community is very concerned about the environmental safety aspects of the project. To address this issue, the developer has agreed to establish a neighborhood-based sub-committee to review and monitor all issues associated with the disposal of hazardous wastes. In addition, the developer will comply with all federal,

state, and local statutes, and any regulations promulgated hereunder relating to the generation, processing, and disposal of medical wastes, and will comply with the requirements of the Guide for the Care and Use of Animals of the National Institute of Health (NIH), and all other applicable federal and state regulations regarding the handling of lab animals.

f. Employment Training

As stated earlier, the Proposed Project will generate 2,275 permanent employment opportunities. To properly prepare local community residents for such opportunities, the Boston University Medical Center has agreed to recruit local residents in its "Work Tech" Program to community residents, provide laboratory space for interested school children, and provide a series of science classes at the School of Medicine during the summer months.

g. Neighborhood Improvements

The developer has agreed to establish an annual fund for the maintenance of Blackstone Square Park, Franklin Square Park, and Worcester Square Park in the amount of $25,000 per year. Such a fund will allow these valuable open space resources to be more adequately maintained.

In addition, University Hospital has agreed to develop a plan for the re-use of its warehouse building located on

East Concord Street in a cooperative effort with the local community.

Open Space and Pedestrian Circulation

The Proposed Project, in conjunction with the development of major new buildings which will provide important jobs to the local economy, will also provide publicly accessible open space. The development provides for the construction of a pedestrian plaza accessible to the South End community. In addition, the extension of the East Concord, East Brookline, and East Newton street patterns through the development site with high quality landscaping treatment will provide increased open space and pedestrian circulation.

Transportation Mitigation

The Proposed Project will generate a total of 450 new vehicle trips in each peak period of the day. Although this new demand will have a negligible impact on the transportation circulation system in the surrounding neighborhood, the developer has agreed to undertake several measures to decrease the project's transportation impacts. First, it will participate in an Inter-institutional Transportation Management Association which will explore traffic demand management measures, including ridesharing, vanpooling, MBTA pass subsidies and staggered work hours. The developer has also agreed to study the feasibility of a bus route from Ruggles Station to Broadway Station utilizing Melnea Cass

Boulevard and Albany Street. Finally, the developer has agreed to designate three neighborhood representatives to work with the Medical Center in its ongoing transportation planning and management.

Ongoing Community Review

Because of the long-term nature of the Proposed Project the developer and community have agreed that a Project Advisory Committee is necessary to monitor the project over the next ten year period. The Committee will meet on a monthly basis, or as needed, to review the project, its components, and compliance with all agreements made over the term of the project.

Planned Development Area Master Plan and Development Impact Project Plan and approval of PDA Development Plan requirements

University Associates has requested several actions from the BRA Board necessary for the project to proceed. Because the developer is seeking a PDA zoning designation for the site, a development plan is required to be submitted and approved by the BRA Board. In addition, Articles 26 and 26B of the Boston Zoning Code require that the Board approve a Development Impact Project Plan which outlines housing linkage and jobs linkage obligations of University Associates. These four documents, the Master Plan, Development Impact Project Plan and two development plans are attached.

A Development Impact Project Agreement (in connection with the Development Impact Project Plan) and a Cooperation Agreement (in connection with the Development Plan) are also attached.

Conclusion

Attached to this memorandum are documents regarding the application of University Associates for a Planned Development Area Master Plan and Development Impact Project Plan for 700 and 710 Albany Street and PDA Development Plans for (624-710 Albany Street).

An appropriate vote follows:

VOTED: That the Authority hereby adopts the attached Resolution entitled "Resolutions of the Boston Redevelopment Authority regarding the University Associates/South End Technology Square Project Planned Development Area Master Plan and Development Impact Project Plan and PDA Development Plans and dated September 26, 1991, consisting of 13 pages, and the Authority specifically adopts the findings incorporated therein, and specifically adopts the votes that are outlined in the last four pages of said Resolution.

BOSTON REDEVELOPMENT AUTHORITY

MASTER PLAN

and

DEVELOPMENT IMPACT PROJECT PLAN

for

PLANNED DEVELOPMENT AREA NO. 41

SOUTH END TECHNOLOGY SQUARE

University Associates Limited Partnership, Developer

September 10, 1991

Planned Development Area Master Plan ("Master Plan") and Development Impact Project Plan ("DIP Plan"): Pursuant to Section 3-1A of the Boston Zoning Code (the "Code"), this Master Plan constitutes a Planned Development Area Master Plan and sets forth a statement of the development concept for the development of an approximately 8.5 acre site at 624-710 Albany Street (Urban Renewal Parcel 46B), Boston, Suffolk County, Massachusetts (the "Property" or the "Site") within a Special Purpose Overlay District Planned Development Area ("PDA"), including the planning objectives and character of the development, the proposed uses of the area, the range of dimensional requirements contemplated for each of the proposed uses, and the proposed phasing of construction of the development (the "Project" or "Projects"). A zoning change for the Site from H-3 and M-2 districts to a B-4 district is being pursued; and it is intended that this Master Plan will become effective once such zoning change has been made. This Master Plan is also intended to satisfy the requirements of Article 26 and Article 26B of the Code regarding Development Impact Project Plans and sets forth the proposed location and appearance of structures, open spaces and landscaping, proposed uses of the buildings, densities, projected number of employees, proposed traffic circulation, parking and loading requirements, access to public transportation, proposed dimensions of structures, public benefits and development review procedures. Two or more Planned Development Area Development Plans ("PDA

Development Plans") will be submitted either simultaneously with or subsequent to the submission of the Master Plan providing more specific information about the various Projects and components thereof.

Developer: University Associates Limited Partnership, a Massachusetts limited partnership to be formed, the general partners of which will be Univer Development Foundation, Inc., a Massachusetts non-profit corporation, and the Trustees of Boston University, a Massachusetts non-profit, educational corporation, its successors and assigns ("University").

Location and Description of Property: The Property consists of a parcel of land containing approximately 372,593 square feet or approximately 8.5 acres, located at 624-710 Albany Street, Boston, Suffolk County, Massachusetts, as more particularly bounded and described in Exhibit A attached hereto and as shown on the plan entitled "University Associates Development Plan in Boston, Mass (South End District)" dated May 2, 1991, revised August 5, 1991, prepared by Bryant Associates, Inc. and included in the set of plans entitled Master Plan for Planned Development Area, South End Technology Square, University Associates, Developer, August 1991," prepared by Cambridge Seven Associates, Inc. ("PDA Plans") copies of which are attached hereto as Exhibit B ("Site" or "Property").

STATEMENT OF DEVELOPMENT CONCEPT

Planning Objectives and Character of Development: The planning objectives for the development of the Site have as a foundation the goals of the Boston University Medical Center "to develop an integrated and coordinated program of education, research, and health for the purpose of providing and maintaining better health in contemporary society". Boston University Medical Center ("Medical Center") was founded in 1962 by the Trustees of Boston University and University Hospital, Inc., and today its member organizations include: Boston University School of Medicine, Boston University Henry M. Goldman School of Graduate Dentistry and the University Hospital. The Medical Center has a close affiliation with its neighbor, Boston City Hospital. The planning objectives for the development of the Site as a medical/research campus will: enable the Medical Center to fulfill its goals as set forth above, promote the development of research facilities in the South End, provide for sufficient office areas to service the medical institutional uses within the South End area, integrate within the medical/research and office uses a hotel use to service the demand created by the development, provide sufficient on-site and above-grade parking suitable for the development and provide for incidental, accessory, ancillary and auxiliary uses necessary and/or convenient for the uses on the Site.

The development plan will allow for the creation of a major medical research campus for the establishment of research institutes and laboratories affiliated with the medical institutions in the South End. The first phase of the development will include the construction of the Center for Advanced Biomedical Research ("Research Center"), the Technology Square Garage ("Garage") and a Doctors' office/clinic building ("Medical Arts Building"). The Research Center will be the catalyst for other medical research and laboratory buildings within the Site and will make a significant contribution to the establishment of Boston as a city in the forefront of biomedical research.

The planning objectives of the development are consistent with the South End Urban Renewal Plan ("Urban Renewal Plan") which was adopted by the City of Boston ("City") on December 6, 1965. The Urban Renewal Plan has as one of its specific objectives the promotion of industry, commerce, and institutions in appropriate locations and the provision of appropriate sites for the necessary expansion and reorganization of medical, institutional and industrial facilities. The planning and design concept in Section 202 of the Urban Renewal Plan recognizes that there are major communities in the South End Urban Renewal Project Area: residential, industrial and medical/institutional. The Urban Renewal Plan focuses the future development of medical/institutional uses in that area of the South End between Harrison Avenue and the Southeast Expressway, the area within which Parcel 46B is located. Thus, the development of Parcel 46B for medical/institutional use is an appropriate development activity within the directives of the Urban Renewal Plan.

Additionally, the planning objectives are consistent with the proposed Development Policy Plan for the South End/Lower Roxbury, which was prepared by the South End/Lower Roxbury Working Group, the Boston Redevelopment Authority ("Authority" or "BRA") and the Mayor's Office. The Development Policy Plan summarizes the recommendations of the Working Group and the BRA for guiding development in the South End/Lower Roxbury area over the next 20 years. The plan establishes as one of its goals the creation of employment opportunities for South End residents within certain specific districts of the South End. One of these districts is designated as a special study area and references the development of this area by Boston University Medical School and University Hospital.

The character of the development will be recognized in two elements: the uses contemplated for the Site and the design and dimensional elements of the Projects. Four major use elements are proposed for the Site: medical research/office with approximately 629,700 square feet of space, parking with approximately 352,000 square feet of space, hotel with approximately 166,000 square feet of space, retail with approximately 17,300 square feet of space and daycare with approximately 12,300 square feet of space. The entire proposed build-out would contain approximately 1,177,300

square feet of space with a site coverage of approximately 37%. The Site would also accommodate additional office and retail uses which are consistent with the development of the Site as a campus for the medical institutions in the South End. Accessory, ancillary and auxiliary uses which are both incidental and integral to the Project include medical, institutional, retail business, service establishments, retail catering, restaurants, entertainment, office, parking, recreational uses and open spaces.

An essential element in the character of the development is the provision for pedestrian plazas and open space within the campus. The pedestrian plaza involves a combination of grass and large and small trees in a geometric pattern which is coordinated with building entrances. Water features and benches are also integrated into the pedestrian plaza design and are shown on the PDA Plans attached hereto. During Phase I, the pedestrian plaza has one expanse approximately 60 feet wide and 400 feet long to the rear of the buildings along Albany Street and another expanse approximately 80 feet wide and 140 feet long between the Research Center and the Doctors' office/clinic building. Upon the completion of Phase I, the total pedestrian plaza area will be approximately 32,000 square feet. Upon the completion of Phase II, the pedestrian plaza is extended between Parcels D and E by an expanse approximately 80 feet wide and 120 feet long, increasing the total open space to approximately 42,000 square feet within the pedestrian plaza area and another 2 acres of landscaped open space along the perimeter of the Site and the Massachusetts Avenue connector. However, as set forth in the "Phase II (Option) Relocated Connector" section of the "University Associates Master Plan Report" dated September, 1991 submitted to and approved by the Boston Civic Design Commission, the pedestrian plaza may be significantly increased if the Central Artery/Tunnel project redesigns the Massachusetts Avenue Connector as a new, on-grade access road, and the resulting additional area is incorporated into the Site. With the increase in land area, one or more buildings could be placed in the southeast corner of the Site, and the pedestrian plaza behind the Research Center and the Medical Arts Building could be expanded by as much as 20,000 square feet over the former footprint of the relocated building on Parcel E, thus increasing the total pedestrian plaza area to as much as 62,000 square feet.

The Site plan capitalizes on the opportunity of providing a gateway to the South End from the new Massachusetts Avenue Connector. Pedestrian activity along Albany Street will be encouraged and stimulated through location of retail uses in each building on Albany Street as well as the location of the hotel and office entrances. The alignment of the pedestrian plaza with the existing South End Street pattern ensures that the open space and plazas conform to the existing alignment in the South End. East Concord Street is proposed to extend past the Garage planned for Parcel A to connect to the new Massachusetts Avenue Connector, and East Brookline Street will be extended along the eastside of the

hotel offering a new access point to the Site and a second entrance to the hotel. East Newton Street is continued through the Site as a pedestrian plaza and will allow for views from the South End through the Site. The contribution of additional open space and plazas is a significant element of this Project. A pedestrian bridge over Albany Street from the building on Parcel C to University Hospital is included in the Project plans, thereby enhancing the linkage of the Projects to the activity in the Medical Center.

Proposed Uses of the Area: The proposed uses for the various Projects within the PDA are set forth on the List of PDA Uses attached hereto as Exhibit C. A description of the major use components of the PDA are set forth below:

Parking Use: A 1,000 car parking Garage is planned for the westerly portion of the Site. The Garage will contain approximately 370,800 square feet of floor area used for retail, daycare and parking on seven (7) levels. The first floor of the Garage will be designed to incorporate day care use as well as retail/commercial space along Albany Street. The entrance to the Garage will be from a proposed extension of East Concord Street and a perimeter service or loop road. To the extent feasible after consideration of the soil conditions of the Site, additional parking may be developed within the Medical Arts Building, hotel, and other buildings to be developed on the Site. During the development of the Projects, surface parking lots will be retained on an interim basis on the undeveloped portion of the Site (but not on the Phase I pedestrian plaza/open space areas), and such parking will be made available to Boston City Hospital and the Medical Center. A proposed parking plan and memorandum of understanding between University and the City's Public Facilities Department regulating the interim use of the Site as a temporary parking lot for BCH and the Medical Center and setting forth the procedure for the replacement of existing parking on the Site is attached hereto as Exhibit D.

Laboratory/Research Use: The project plans for the Research Center include a biomedical research building containing approximately 180,000 square feet of floor area with a height of 144 feet and a 28 foot penthouse containing mechanical systems necessary for the operation of laboratory research facilities. This building will be an integral part of the Medical Center and serve as a scientific research and teaching laboratory. Phase II plans, as hereinafter described, contemplate the development of additional biomedical research and/or office buildings on the Site. The Site has the potential for approximately 400,000 to 630,000 square feet of laboratory research use which evidences the potential for the area to be a major laboratory research area of Boston.

Doctors' Office/Clinic Use: Project plans contemplate the construction of the 160,000 square foot Medical Arts Building on Albany Street to be used by University Hospital as a medical office/ambulatory care/clinic. This building would be connected to the existing University Hospital building on Albany Street via a pedestrian bridge. This project would allow University Hospital to provide additional outpatient care and ambulatory services and to provide modern office facilities for the hospital's physicians and evidences the continued community involvement of University Hospital.

Office Use: Office/research use may be located within the two additional buildings adjacent to the Massachusetts Avenue Connector. Each one of the two office/research buildings would contain approximately 140,500 to 160,000 square feet of floor area.

Hotel Use: The second phase of the development also includes plans for a 240-room hotel with a 180-seat restaurant and function facilities. The hotel use would be compatible with the medical research buildings and Medical Arts Building and serve a need for visitors and patients to the medical institutions within the area.

Retail Use: An aggregate of approximately 17,300 square feet of Retail/Commercial space is contemplated for the Garage, medical research building, the Medical Arts Building and the hotel. Retail/commercial space will be located along Albany Street and will contribute greatly to pedestrian activity and safety in the area, and will serve the needs of the local community.

Open Space Use: A landscaping and paving plan for the Site includes the creation of a pedestrian plaza which will serve to maximize views to and from the South End as well as to contribute to the boulevard character for the new Massachusetts Avenue Connector. Landscaping will be noted for its rich vocabulary in pavers, plantings, lighting, signage and other street furniture throughout the Site. The pedestrian plaza will include a combination of grass, large and small trees in a geometric pattern which will be coordinated with building entrances. Water features and benches are also integrated into the pedestrian plaza design. Additionally, plans contemplate a planting buffer zone between the Projects and the present Massachusetts Avenue Connector, as well as additional plantings upon the relocation of the Massachusetts Avenue Connector after the depression of the Central Artery. During Phase I, the pedestrian plaza has one expanse approximately 60 feet wide and 400 feet long to the rear of the buildings along Albany Street and another expanse approximately 80 feet wide and 140 feet long between the Research Center and the Medical Arts Building. Upon the completion of Phase I, the total pedestrian plaza area will be approximately 32,000 square feet. Upon the completion of Phase II, the pedestrian plaza is extended between Parcels D and E by an expanse approximately 80 feet wide and 120

feet long, increasing the total open space area to approximately 42,000 square feet within the pedestrian plaza area and another 2 acres of landscaped open space along the perimeter of the Site and the Massachusetts Avenue connector. However, as set forth in the "Phase II (Option) Relocated Connector" section of the "University Associates Master Plan Report" dated September, 1991 submitted to and approved by the Boston Civic Design Commission, the pedestrian plaza may be significantly increased if the Central Artery/Tunnel project redesigns the Massachusetts Avenue Connector as a new, on-grade access road, and the resulting additional area is incorporated into the Site. With the increase in land area, one or more buildings could be placed in the southeast corner of the Site, and the pedestrian plaza behind the Research Center and the Medical Arts Building could be expanded by as much as 20,000 square feet over the former footprint of the relocated building on Parcel E, thus increasing the total pedestrian plaza area to as much as 62,000 square feet.

Range of Dimensional Requirements: Dimensional elements of each Project within the PDA such as: the height, parking ratio, planning and design requirements are subject to BRA review in accordance with the requirements of the Urban Renewal Plan and the Cooperation Agreement to be entered into between the Developer and the BRA. A range of dimensional requirements for each of the six proposed Projects is set forth below:

Use/Building	Area	Height
Garage/Retail/Daycare	370,800	80 feet
Research/Retail	180,000	144 feet w/28' PH
Office/Clinic/Retail	160,000	110 feet
Office/Research	140,500	110 feet
Office/Research	160,000	110 feet
Hotel	166,000	100 feet
Total	1,177,300	

Proposed Phasing of Construction: The Projects contemplated in the Master Plan involve a building program of essentially two phases. Phase I involves the development of the Garage on Parcel A, the Research Center building on Parcel B and the Medical Arts Building on Parcel C. Phase II involves the development of research/office buildings on Parcels D and E, and a hotel on Parcel F. Therefore, the Project plans include a site plan which subdivides the Site into six development parcels: A, B, C, D, E and F. Construction is expected to begin on Parcel B in the last quarter of 1991. It is anticipated that the development and construction of the Research Center building on Parcel B will take approximately 18 to 24 months. Within six months of the start of construction of this building on Parcel B and subject to financing and approvals, it is contemplated that construction will commence on the Garage. Within nine months of the commencement of construction of the Research Center, present plans contemplate the

commencement of construction on the Medical Arts Building. Construction time for the Garage and the Medical Arts Building are each approximately 12 to 18 months.

It is anticipated that in addition to the construction of the Research Center building, the Garage and the Medical Arts Building, additional site work involving the access road to the Garage, landscaping and plantings will be developed as well as a reconfiguration of the existing parking areas on the remaining undeveloped portion of the Site. It is estimated that the development of Parcels D, E and F for office/research buildings and the proposed hotel will occur in the second half of a ten year development schedule subject to the availability of financing, approvals and tenant/investor interest.

Planning and development activities will be programmed so that each Project and parcel within the Site will be zoned and developed separately. It is contemplated that such parcels may either be sold or leased for development and this will necessitate the establishment of separate zoning parcels or "lots" and the creation of separate development plans for each parcel. As set forth in the preliminary statement of this Master Plan, it is contemplated that two or more development plans will be submitted simultaneously with the Master Plan and DIP Plan. Development plans for subsequent buildings will be prepared and submitted to the Authority in the future.

Future Development Phasing: As referenced in the draft Project Impact Report submitted to the Authority in accordance with Article 31 of the Code, additional areas may be added to the Site upon the completion of the Central Artery Tunnel project and the relocation of the Massachusetts Avenue Connector. Furthermore, the adjacent parcel at 600 Albany Street, which is owned by one of the general partners of the Developer, Univer Development Foundation, Inc., is contemplated to be used for parking during the development of the Projects. Such adjacent parcel, and any additional areas resulting from the relocation of the Massachusetts Avenue connector and conveyed to the Authority from the Commonwealth of Massachusetts through the City for urban renewal purposes or development in accordance with plans approved by the BRA as consistent with the general plan for the City, may be incorporated into the Master Plan PDA subject to the Authority's approval in accordance with Article 3-1A of the Code.

DEVELOPMENT IMPACT PROJECT PLAN

Proposed Location and Appearance of Structures: The location and appearance of structures within the PDA will be subject to BRA Development Review. It is proposed that the siting of the Garage, Research Center building, the Medical Arts Building, the office and research buildings and the hotel will be as shown on the PDA Plans. Modifications to the appearance and

location of the structures may result from a series of governmental approvals by the Authority and State and Federal agencies in connection with a review of the Project/Projects during the phased development of the Site.

The materials and design elements of the buildings in Phase I have been selected to be compatible with the historic and institutional/industrial character of the area and to respect the material, form and scale of the South End. The massing of the buildings is in keeping with other buildings in the area and employs similar techniques to deal with horizontal and vertical elements. The buildings within the entire project will be similar in style so as to offer a unity in rhythm throughout the complex and especially along Albany Street. The Garage will employ brick and glazing in a manner which is sympathetic to the historic district. The design of the Garage will allow for the separation of garage activity from daycare and retail activity on the first floor. The Research Center will also be brick with a precast treatment which will be compatible with other buildings in the area. A two-story mechanical penthouse design mimics the lower level horizontal feature in a manner that enhances the overall building massing and design. The design, massing and materials used in the other buildings in Phase I and Phase II will be reflective of the historic character of the South End. The pedestrian plaza will incorporate pavers and landscaping to accentuate its use as a pedestrian area and to provide a unifying fabric for the overall campus development.

Open Spaces and Landscaping: Phase I of the development contemplates the construction of the Research Center, the Garage and the Medical Arts Building. During the construction of these three buildings, landscaping and open space elements will be completed within the vicinity of the buildings so that a portion of the Site will be landscaped within the area of development. The remaining portion of the Site, which consists of Parcels D, E and F will be used for parking by Boston City Hospital and the Medical Center and buffer zones between the parking and the development on Parcels A, B and C will be provided by the developer. It is contemplated that the landscape and open space plan will be developed in phases so that each of the Projects will contribute additional segments to the landscaping and open space plan. The alignment of the pedestrian plaza with the existing South End street system provides a consistency in the extension of the visual element of East Brookline Street, East Newton Street and East Concord Street. Although the Project will have a perimeter service loop road, the internal area of the campus will be designed for pedestrian use. The elements of the landscaping are shown on the Landscape Features included within the PDA Plans. During Phase I, the pedestrian plaza has one expanse approximately 60 feet wide and 400 feet long to the rear of the buildings along Albany Street and another expanse approximately 80 feet wide and 140 feet long between the Research Center and the Medical Arts Building. Upon the completion of Phase I, the total open space

area will be approximately 32,000 square feet. Additionally, plans contemplate a planting buffer zone between the Projects and the present Massachusetts Avenue Connector, as well as additional plantings upon the relocation of the Massachusetts Avenue Connector after the depression of the Central Artery. Upon the completion of Phase II, the pedestrian plaza is extended between Parcels D and E by an expanse approximately 80 feet wide and 120 feet long, increasing the total open space area to approximately 42,000 square feet within the pedestrian plaza area and another 2 acres of landscaped open space along the perimeter of the Site and the Massachusetts Avenue connector. However, as set forth in the "Phase II (Option) Relocated Connector" section of the "University Associates Master Plan Report" dated September, 1991 submitted to and approved by the Boston Civic Design Commission, the pedestrian plaza may be significantly increased if the Central Artery/Tunnel project redesigns the Massachusetts Avenue Connector as a new, on-grade access road, and the resulting additional area is incorporated into the Site. With the increase in land area, one or more buildings could be placed in the southeast corner of the Site, and the pedestrian plaza behind the Research Center and the Medical Arts Building could be expanded by as much as 20,000 square feet over the former footprint of the relocated building on Parcel E, thus increasing the total pedestrian plaza area to as much as 62,000 square feet.

Proposed Uses of the Areas and Buildings: As set forth herein, the main category of uses for the Site is consistent with a medical/research institutional use affiliated with University Hospital and the Medical Center. Specific uses for the Parcels within the Site are:

Parcel	Uses
Parcel A	Garage, Commercial, Retail, Day Care and Recreational
Parcel B	Medical Research Facility, Laboratory, Commercial and Retail
Parcel C	Doctors' Offices, Clinic, Commercial, Retail and Parking
Parcel D	Office, Laboratory, Commercial, Retail and Parking
Parcel E	Office, Laboratory, Commercial, Retail and Parking
Parcel F	Hotel, Commercial, Retail and Parking

In addition to the specific uses set forth above, the Site will contain accessory, ancillary, auxiliary uses which are necessary and/or convenient for the development and operation of the Project. These uses are set forth on Exhibit C attached hereto.

Density and Zoning. Project densities are divided into two specific categories: Overall site density and individual parcel density. As hereinbefore referenced, it is contemplated that each parcel may be developed by separate entities and as a separate zoning lot for development and financing purposes. Therefore, it will be necessary to establish the approximate density of each development parcel within the Site. Based upon present plans, the approximate densities of the Site are as follows:

PARCEL DATA

Parcel A	91,411 sq.ft.	Parcel B	35,178 sq.ft.
Building 1	370,800 sq. ft.	Building 2	180,000 sq. ft.
FAR	4.0	FAR	5.1
Footprint	44,000 sq. ft.	Footprint	20,000 sq. ft.
Lot Coverage	48%	Lot Coverage	57%
Parcel C	31,872 sq. ft.	Parcel D	60,354 sq. ft.
Building 3	160,000 sq. ft.	Building 4	140,500 sq. ft.
FAR	5.0	FAR	2.4
Footprint	20,000 sq. ft.	Footprint	20,000 sq. ft.
Lot Coverage	63%	Lot Coverage	33%
Parcel E	64,775 sq. ft.	Parcel F	89,003 sq. ft.
Building 5	160,000 sq. ft.	Building 6	166,000 sq. ft.
FAR	2.5	FAR	1.9
Footprint	20,000 sq. ft.	Footprint	15,000 sq. ft.
Lot Coverage	31%	Lot Coverage	17%

Development Site	372,593 sq. ft.
Total Buildings	1,177,300 sq. ft.
FAR	3.2
Total Footprint	139,000 sq. ft.
Lot Coverage	37%

The Site is located within an H-3 Zone as shown on Map 1, "Boston Proper" of the Zoning Map of the City of Boston. A portion of the Site is also located within an M-2 Zone. The H-3 Zone is a residential (apartment) district with a maximum Floor Area Ratio ("FAR") of three (3), while the M-2 Zone is an industrial (light manufacturing district with a maximum FAR of two (2). In order to comply with the Master Plan Planned Development Area requirements, as set forth in Article 3-1A of the Code, a district change from H and M districts to a B district is required

for the Project. Additionally, the FAR of the Projects within the Site range from 1.9 to 5.1 and the overall FAR is 3.2. Therefore, simultaneously with the submission of a request for approval of the Master Plan, a request will be submitted to the Zoning Commission to approve a re-zoning of the Site from a H-3 and M-2 Zone to a B-4-D Zone.

Due to the location and size of the buildings and the need to establish separate development parcels for the development and financing of the various Projects, it is contemplated that certain provisions of the Code will not be met by the project design. Therefore, pursuant to Article 6A of the Code, Exceptions may be granted by the Board of Appeal for projects located within planned development areas and urban renewal subdistricts. It is contemplated that, based upon present development planning, the following Exceptions are needed from the provisions of the Code:

1. Conditional Use Permits or Exceptions Required for Article 8, Section 8-7, Uses:

Use Number	Use	Status	
16A	College/University	Conditional	C
18	Trade/Professional School	Conditional	C
22	Hospital/Clinic, professional offices accessory to a hospital	Conditional (Allowed	C A)
24	Scientific research and teaching laboratories non-profit/accessory to Uses 16, 16A, 18, 22 or 23	Conditional (Allowed	C A)
34	Local retail business (outdoor display)	Allowed Conditional	A C
36A	Retail catering	Conditional	C
58	Parking Lot	Conditional	C
59	Parking Garage	Conditional	C
60	Repair Garage, gasoline station, car wash	Conditional	C
61	Car rental agency	Conditional	C

66	Helicopter Landing Facility	Conditional	C
68	Manufacturing of Pharmacu-tial Products	Forbidden	F
71	Ancillary Uses	Conditional	C
72	Accessory Parking Use	Conditional	C
77	Keeping of Laboratory Animals	Conditional	C

2. Exceptions Required for Dimensional Requirements:

Article 2,	Section 2-1	Area and Lot Definitions
Article 15,	Section 15-1	Floor Area Ratio
Article 19,	Section 19-1	Minimum Side Yard
Article 20,	Section 20-1	Minimum Rear Yard
Article 21,	Section 21-1	Minimum Setback Requirements
Article 24,	Section 24-1	Off-Street Loading Requirements

In addition to the Exceptions set forth above, each development plan for each Project within the PDA will contain a list of Exceptions.

Projected Number of Employees: It is anticipated that the Project will generate approximately 2,600 construction jobs over the entire life of the Project. With respect to permanent jobs, based upon the current development planning, approximately 2,275 jobs will be created.

Proposed Traffic Circulation: The present use of the Site as a parking lot generates traffic from Albany Street and Massachusetts Avenue to two main parking lots within the Site. With the development of the Site as six separate development parcels, traffic circulation will be limited to a perimeter service loop road connected to Albany Street. Additionally, it is contemplated that parking may be constructed below one or more of the office buildings and hotel with entrances off the perimeter service road and/or Albany Street. Additional plans call for the connection of an extension of East Concord Street to a four-way intersection with the proposed new Massachusetts Avenue Connector. Restrictions would be established limiting vehicular accessibility to East Concord Street and Albany Street from the Massachusetts Avenue Connector. Traffic circulation within the Site would be limited to the perimeter service road for delivery and emergency vehicles and general vehicular traffic would not be permitted. The Developer will enter into a Transportation Access Plan Agreement with the City of Boston which will outline specific strategies such as roadway and traffic control improvements, traffic demand management, public transportation, parking management, loading, pedestrian improvements and construction traffic management. The goal will be to create a comprehensive

and realistic plan that is sensitive to the needs of those likely to be affected by the Project, including the construction activities. Construction activities will be coordinated with the reconstruction of the Central Artery.

With respect to pedestrian circulation, a Pedestrian Circulation Plan is included within the PDA Plans attached hereto as Exhibit B. Such Plan shows proposed pathways and pedestrian areas not only within the Site, but also along Albany Street and various points within the Medical Center Campus and University Hospital complex. The pedestrian environment will be improved with the incorporation of plazas, lighting, trees, brick sidewalks, and a pedestrian bridge linking the Project to University Hospital.

Parking and Loading Requirements: Project plans call for the construction of a 1,000 car parking Garage on Parcel A. To the extent feasible after consideration of the soil conditions of the Site, additional parking may be developed within the Medical Arts Building, hotel, and other buildings to be developed on the Site. Additional parking is available for Project users on land controlled by the Developer within the vicinity of the Site, but not presently included in the Master Plan PDA. An additional parking garage containing approximately 1,243 spaces may be constructed on such area which may also be incorporated into the Master Plan PDA subject to the Authority's approval. During the development of the Projects, surface parking lots will be retained on an interim basis on the undeveloped portion of the Site and such parking will be made available to Boston City Hospital and the Medical Center. A proposed parking plan and memorandum of understanding between University Associates and the City's Public Facilities Department regulating the interim use of the undeveloped portion of the Site (other than the Phase I pedestrian plaza/open space areas) as a temporary parking lot for BCH and the Medical Center and setting forth the procedure for the replacement of existing parking on the Site is attached hereto as Exhibit D.

The loading areas for the Project will consist of five (5) off-street loading facilities as shown on the Site Plan. These loading areas would serve from 8 to 13 delivery vehicles at a time depending upon the size of the vehicle. Proposed loading areas would be located at ground level and all loading activity would be off-street. Specific elements of the loading bays and the number and size of each would be described in the development plan for each Project.

Access to Public Transportation: With the relocation of the Orange Line to the Southwest Corridor, the availability of rapid transit service to the Project area has been reduced, although the MBTA has instituted bus service along Albany Street. The Project contemplates as a mitigation procedure under the Draft Environmental Impact Report the evaluation of an expansion of bus service between the Red and Orange Lines via Melnea Cass

Boulevard. Additionally, the Developer intends to coordinate with the MBTA in the promotion of public transportation together with carpools, vanpools and the caravan system. The City has recently proposed a development of a new rapid transit line within the area and the Developer will work closely with the Department of Transportation and the Authority in this regard. The Developer also will enter into an Inter-institutional Transportation Management Association ("ITMA") Agreement which would have as its specific objective: the implementation of measures that minimize automobile use to and from the area. The ITMA will seek to accomplish this objective by: promoting the concept of ride sharing through project marketing efforts, implementing a computerized ride share program, establishing a public awareness program on transportation options, establishing a preferential parking program for carpools and vanpools, sponsoring a semi-annual transportation awareness day, promoting bicycle transportation and encouraging employers to implement alternative work schedules and to promote increase usage of public transportation services.

Proposed Dimensions of Structures: The dimension of the structures, including elevations, schematic layout drawings and exterior building designs are shown on the PDA Plans attached hereto as Exhibit B.

Public Benefits: The Project will provide substantial public benefits to the City of Boston and the surrounding neighborhood. Not only will the Project provide direct benefits due to the development, construction and occupancy of the Project, but also the Project will insure continuation and strengthening of existing public benefits to the City and the neighborhood from the operation of the Medical Center and University Hospital. This Project is unique in the extent of public benefits in that it will ensure the continuation, strengthening and expansion of existing medical research institutions in the area. This Project will generate both direct and indirect economic benefits and directly affect the economic issues of jobs, health care, and education, which are of great importance to the City in the 1990's and the next century. These benefits are wide ranging and comprehensive and are directed to City of Boston residents, school children, and those in need of medical care. The additional benefits resulting from the Project will include a unique educational and occupational opportunity for graduates of Boston high schools in biomedical research programs and the clinical sciences of Boston University School of Medicine. The opportunity provides an opening for City of Boston residents and their children to make a contribution to the advancement of medical research in the City and to strengthen the economic fabric of the South End and the medical and institutional community.

In addition to these long-term and substantial benefits from the Project and its sponsors, the Project will also provide transportation alternatives in the South End by the establishment

of the ITMA and the establishment of a maintenance program for Franklin Square, Blackstone Square and Worcester Square parks in conjunction with the Boston Parks Department. The Projects are expected to generate approximately $725,300 in Jobs Linkage, $3,676,500 in Housing Linkage and significant contributions to the City in the form of taxes and PILOTs. It is anticipated that the Project will generate approximately 2,600 construction jobs over the entire life of the Project. With respect to permanent jobs, based upon the current development planning, approximately 2,275 jobs will be created. In summation, the DIP Plan and Agreement will provide for the continuation and enhancement of numerous public benefits from the Projects and from the sponsors of the Projects through the continuation of the medical research and institutional uses in the South End and the strengthening of such uses.

Development Review Procedures: All design plans for the Project are subject to on-going development review and approval of the BRA. Such review is to be conducted in accordance with Article 31 of the Code and the BRA Development Review Procedure, dated 1985, revised 1986, in the form attached to the Cooperation Agreement as defined and modified by such Cooperation Agreement.

LIST OF EXHIBITS
to
BOSTON REDEVELOPMENT AUTHORITY MASTER PLAN
and
DEVELOPMENT IMPACT PROJECT PLAN
for
PLANNED DEVELOPMENT AREA NO. 41

SOUTH END TECHNOLOGY SQUARE

Exhibit A	Site Description
Exhibit B	Set of plans entitled: "Master Plan for Planned Development Area, South End Technology Square, University Associates, Developer, August 1991"
Exhibit C	List of PDA Uses
Exhibit D	Parking Plan and Memorandum of Understanding by and between University Associates Limited Partnership and Public Facilities Department of the City of Boston.

EXHIBIT A

PDA SITE DESCRIPTION

MASTER PLAN SITE

A certain parcel of land in Boston, Suffolk County, Massachusetts, shown on a plan entitled "University Associates Development Plan in Boston, Mass. (South End District)," prepared by Bryant Associates, Inc., dated May 2, 1991, revised August 5, 1991, scale 1" = 40', to be recorded with the Boston Redevelopment Authority for Master Plan for Planned Development Area No. 41 pursuant to Article 3, Section 3-1A of the Boston Zoning Code, and bounded and described according to said plan as follows:

Beginning at a point on the southeasterly side of Albany Street at the northwesterly corner of said parcel as shown on said plan, and thence running

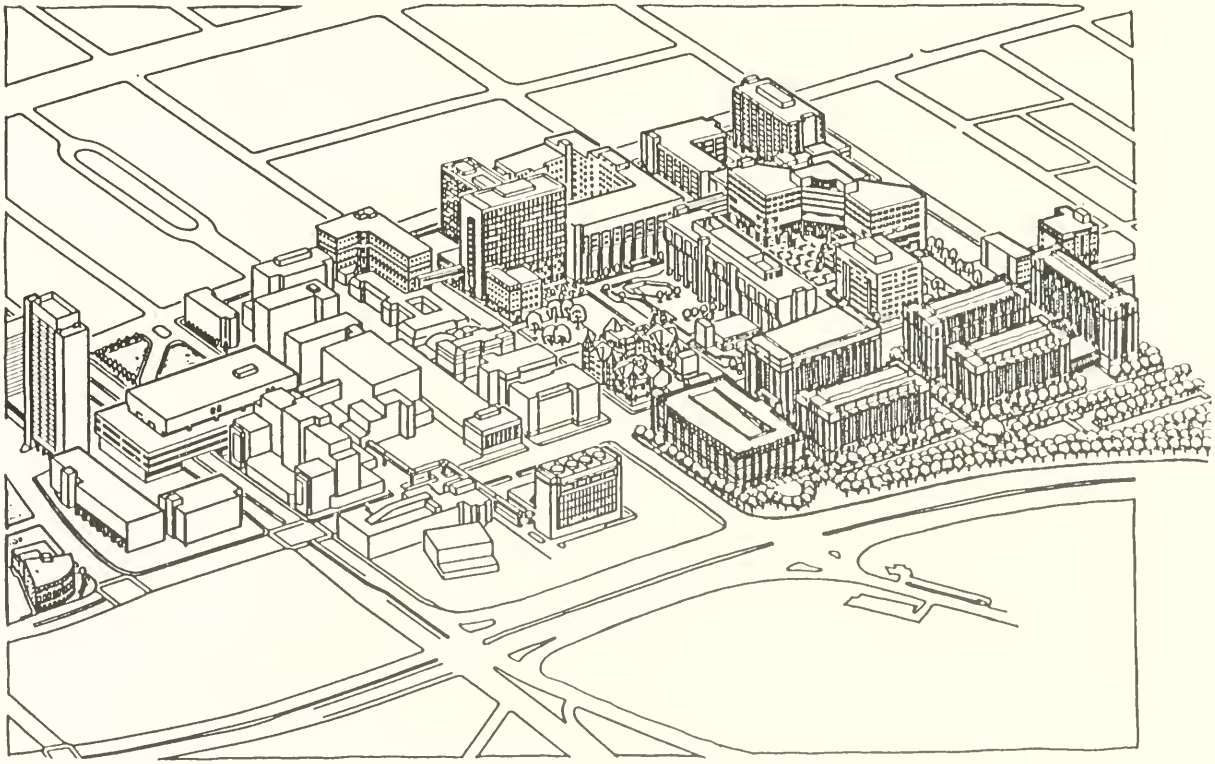
NORTH 45° 56' 20" EAST by Albany Street for a distance of one thousand-fourteen and 35/100 (1,014.35) feet; thence turning and running

NORTH 44° 03' 40" WEST for a distance of four hundred forty-nine and 14/100 (449.14) feet; thence turning and running

SOUTH 55° 06' 9" WEST for a distance of one thousand twenty-seven and 46/100 (1,027.46) feet; thence turning and running

SOUTH 44° 03' 40" EAST for a distance of two hundred and eighty-five and 51/100 (285.51) feet to the point of beginning;

Containing 8.5 acres, or 372,593 square feet, of land (more or less), according to said plan.



August 1991

Master Plan for Planned Development Area
South End Technology Square

University Associates, Developer

Index

Cover Sheet			
Neighborhood Plan	1	Pedestrian Circulation Plan	8
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Key Plan 1 of Build	5	Site photographs	12
Phase 1 Site Plan	6	Elevations and Sections	13
Service and loading Plan	7	Aerial Views	14

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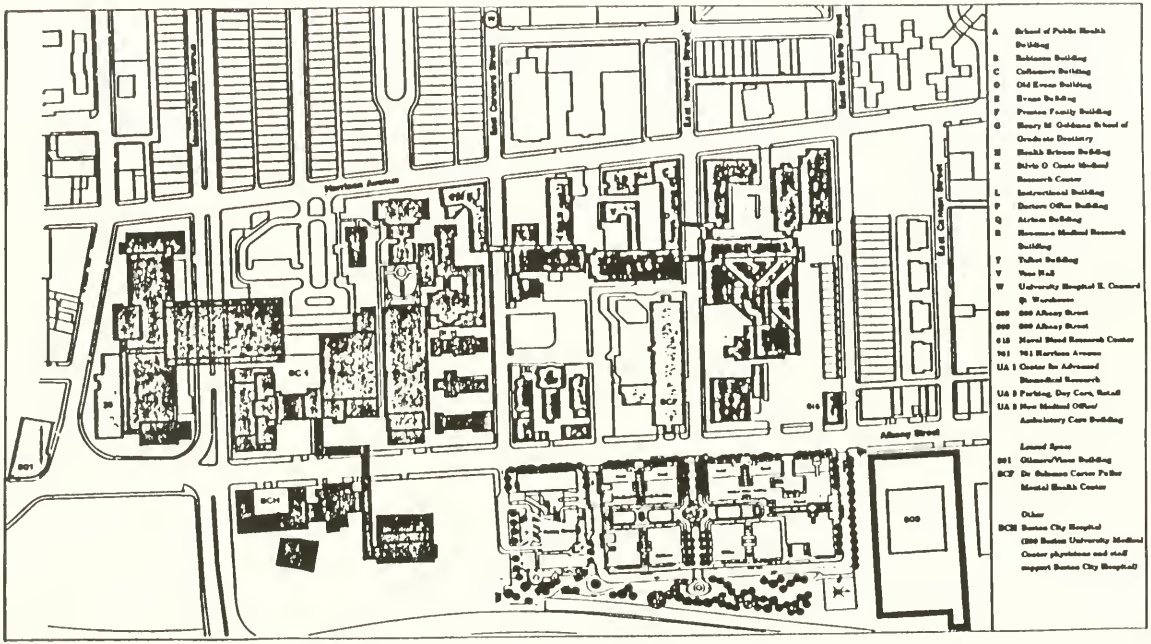


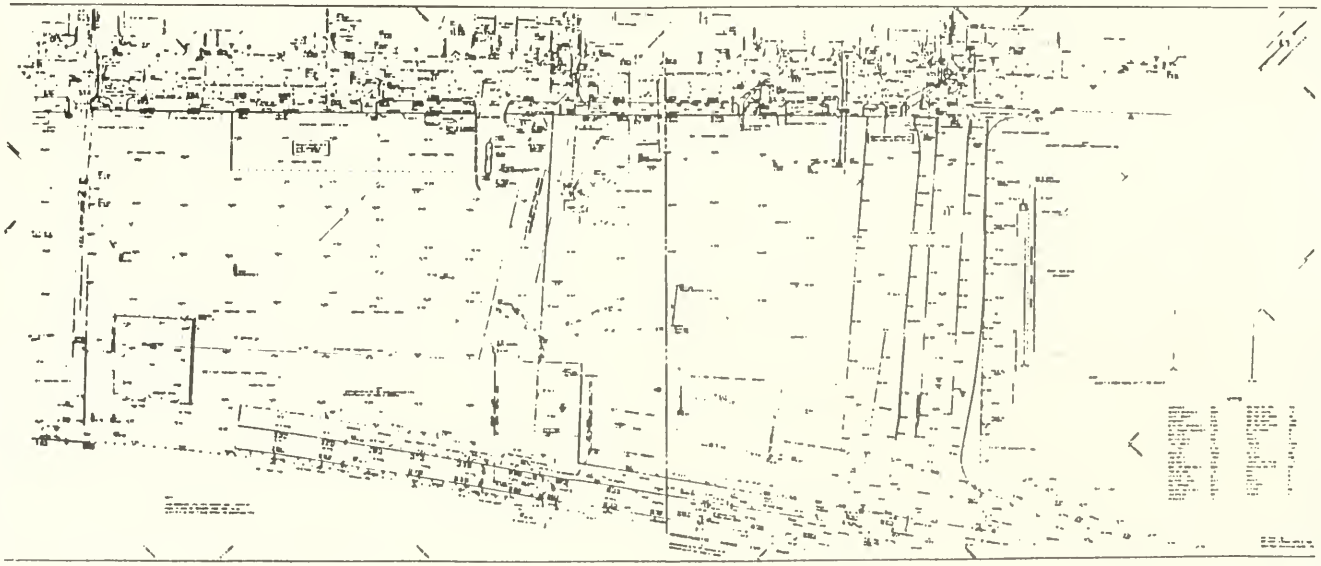
Master Plan

Illustration II

Boston University Medical Center

Cambridge Seven Associates, Inc.

Neighborhood Plan



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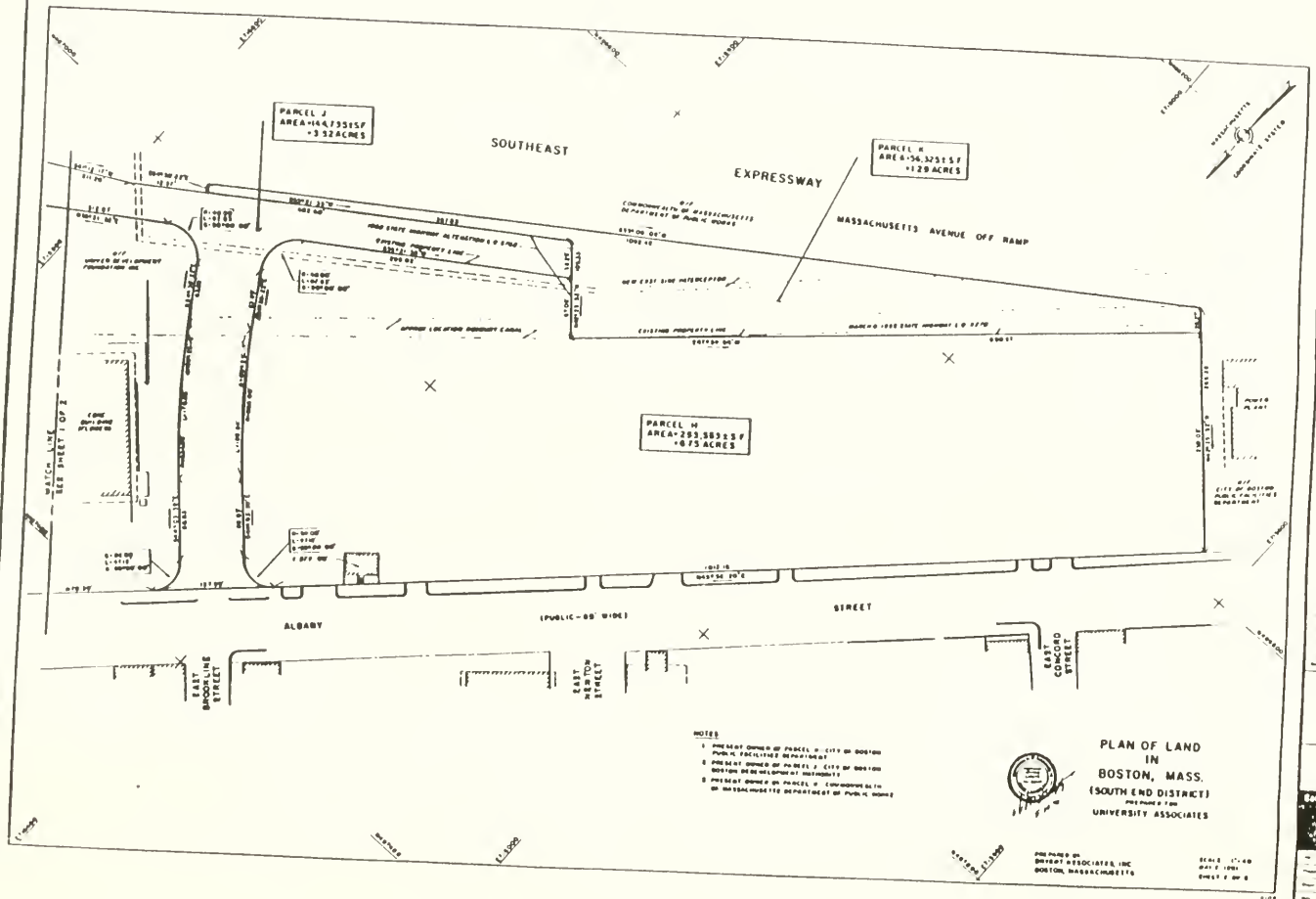
Survey Plan

2

University Associates

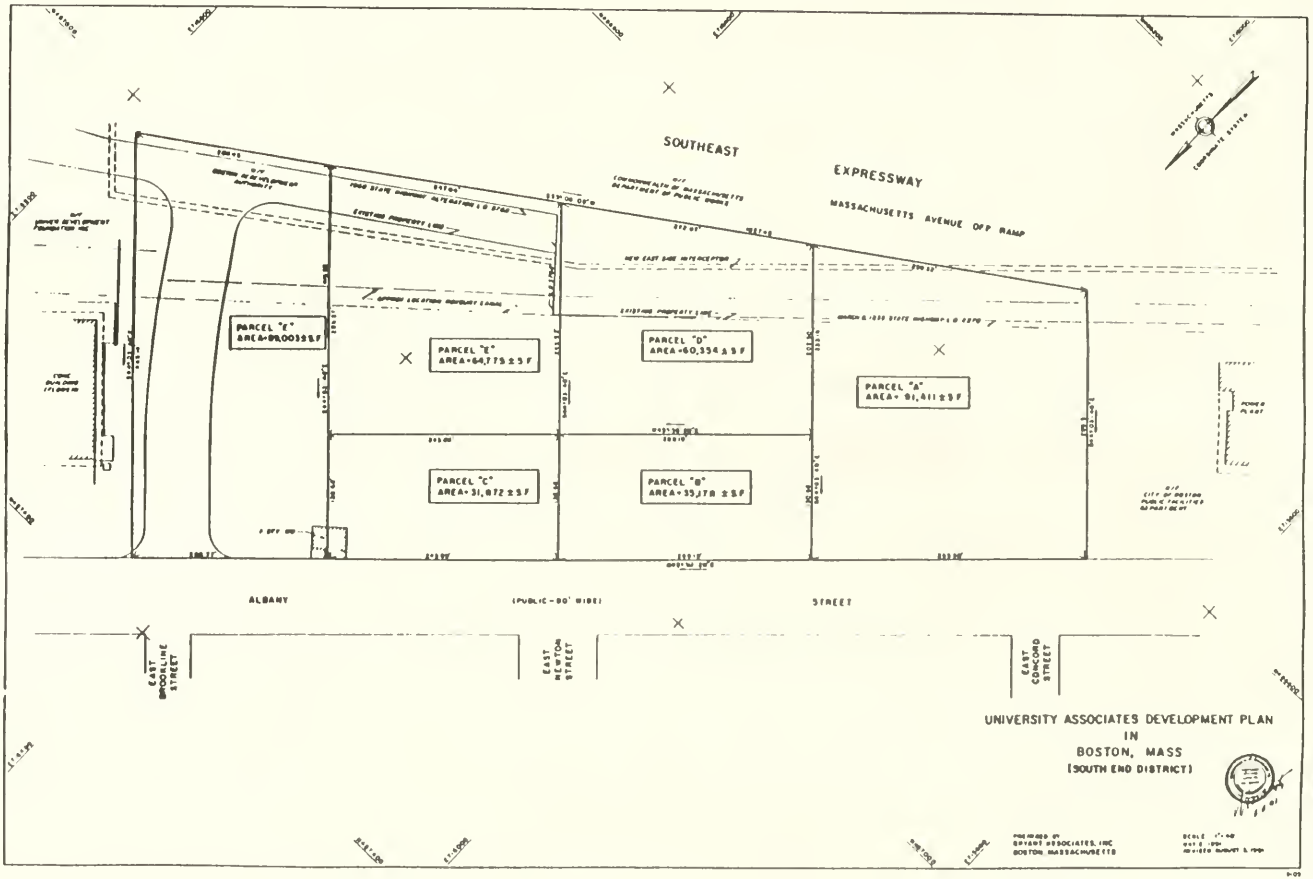


Cambridge Seven Associates, Inc.

Plan of Land

2

University Associates



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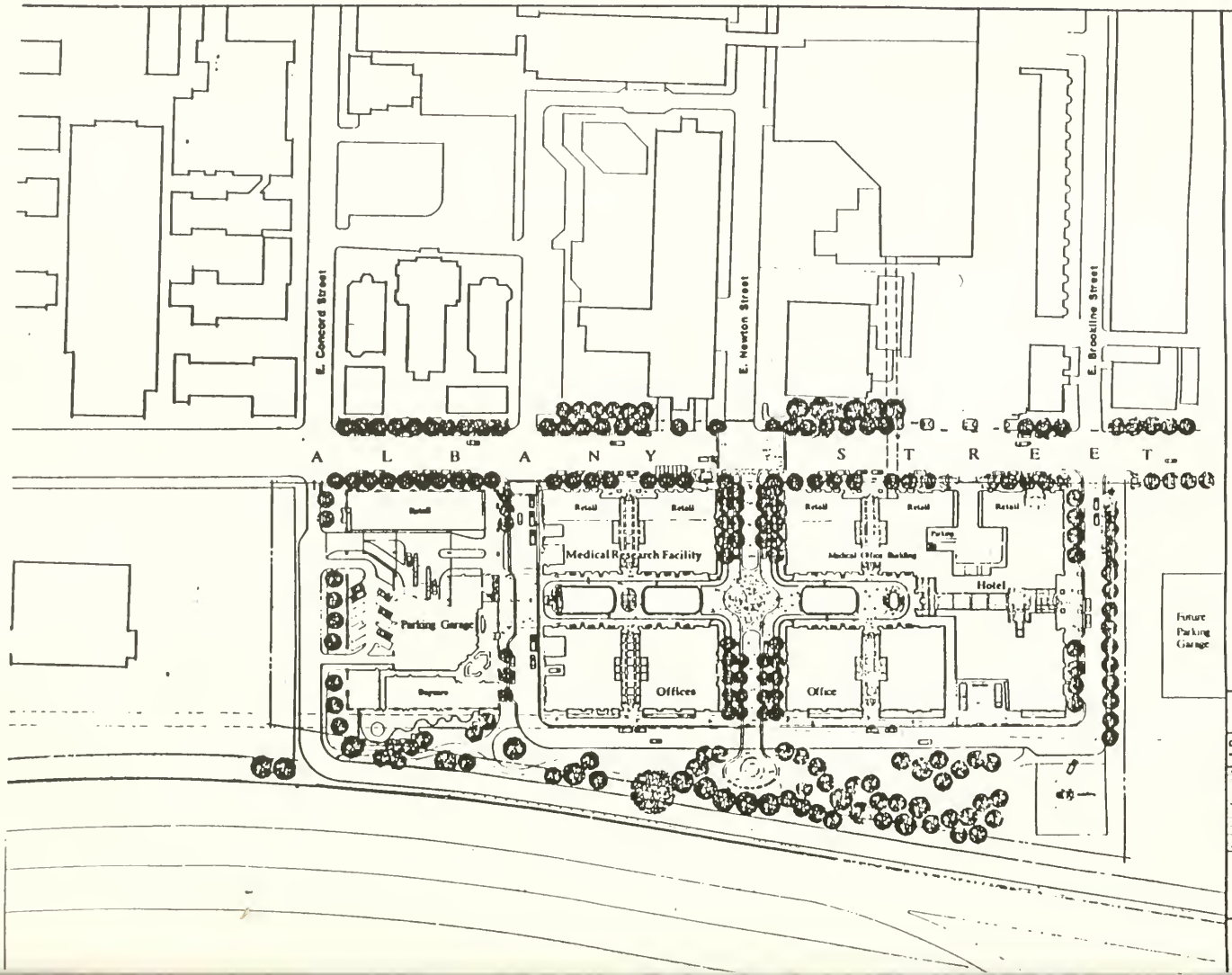
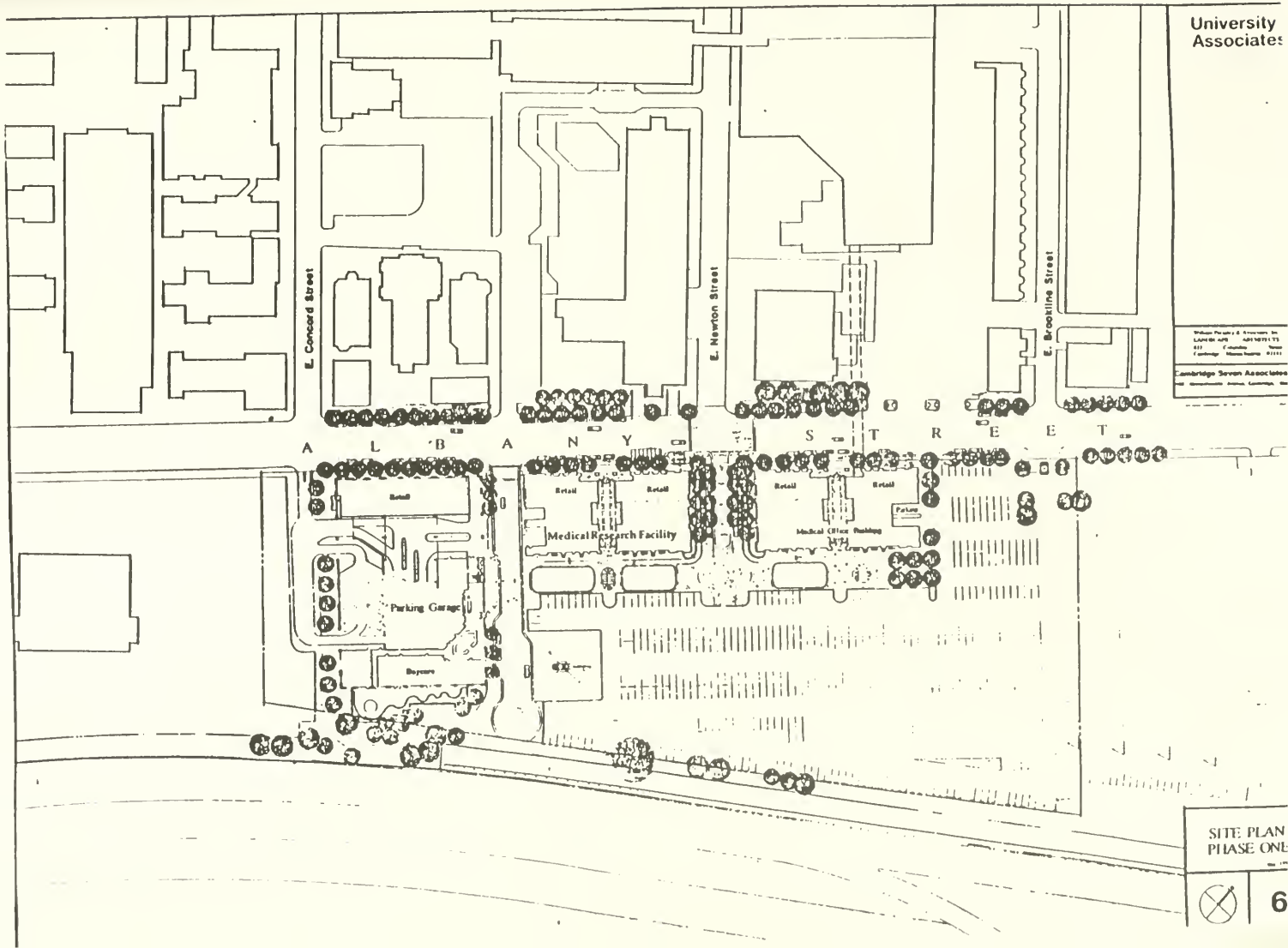
Parcel Plan

4


University Associates
E. Concord Street
E. Newton Street
E. Brookline Street
A L B A N Y S T R E E T
Retail
Retail
Retail
Retail
Retail
Retail
Medical Research Facility
Medical Office Building
Parking
Hotel
Parking Garage
Offices
Office
Future Parking Garage
Cambridge Seven Associates, Inc.
SITE PLAN
FULL BUILD
5


University Associates
E. Concord Street
E. Newton Street
E. Brookline Street
A L B A N Y S T R E E T
Retail
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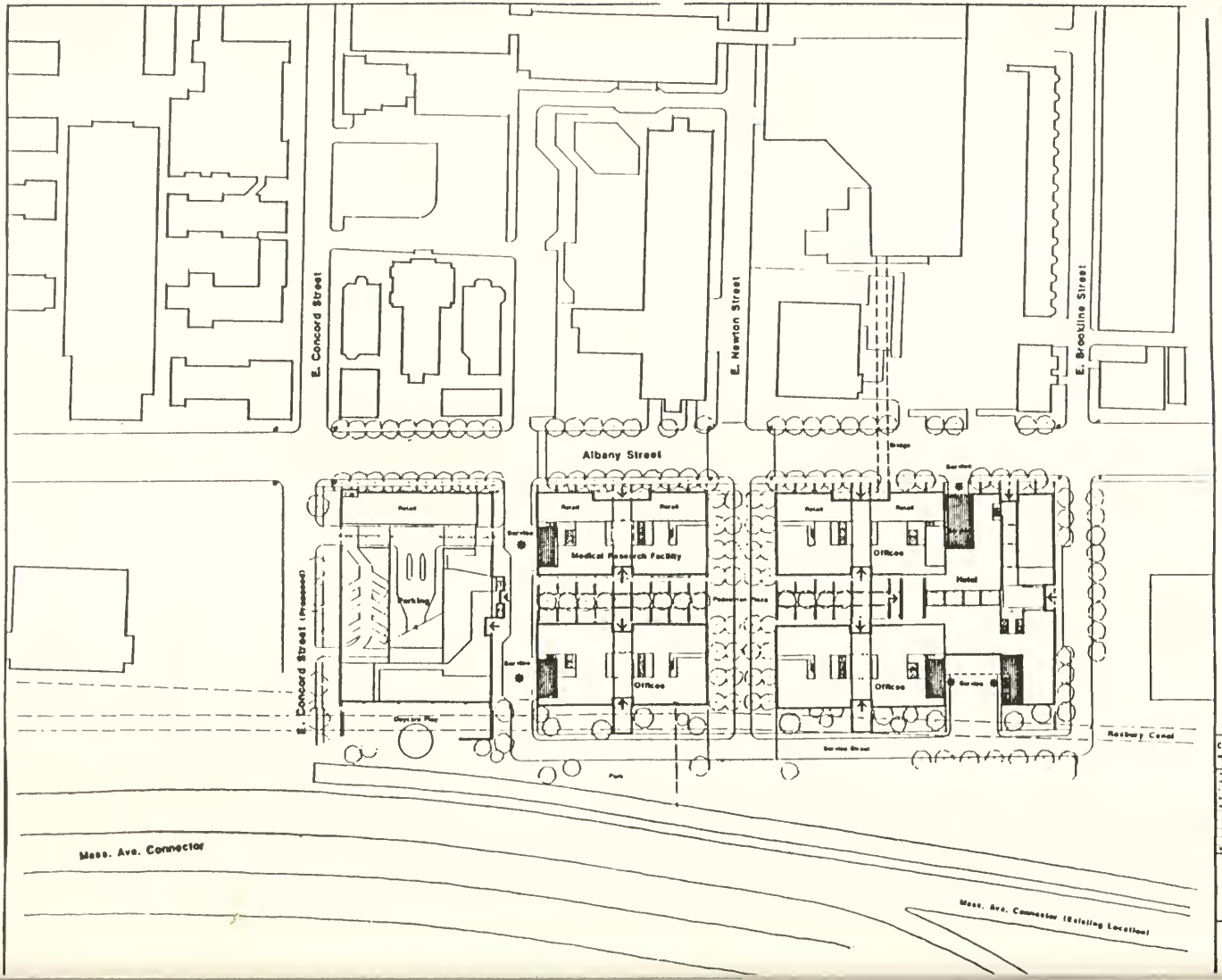
Medical Research Facility
Medical Office Building
Parking Garage
Cambridge Seven Associates
SITE PLAN
PHASE ONE
6



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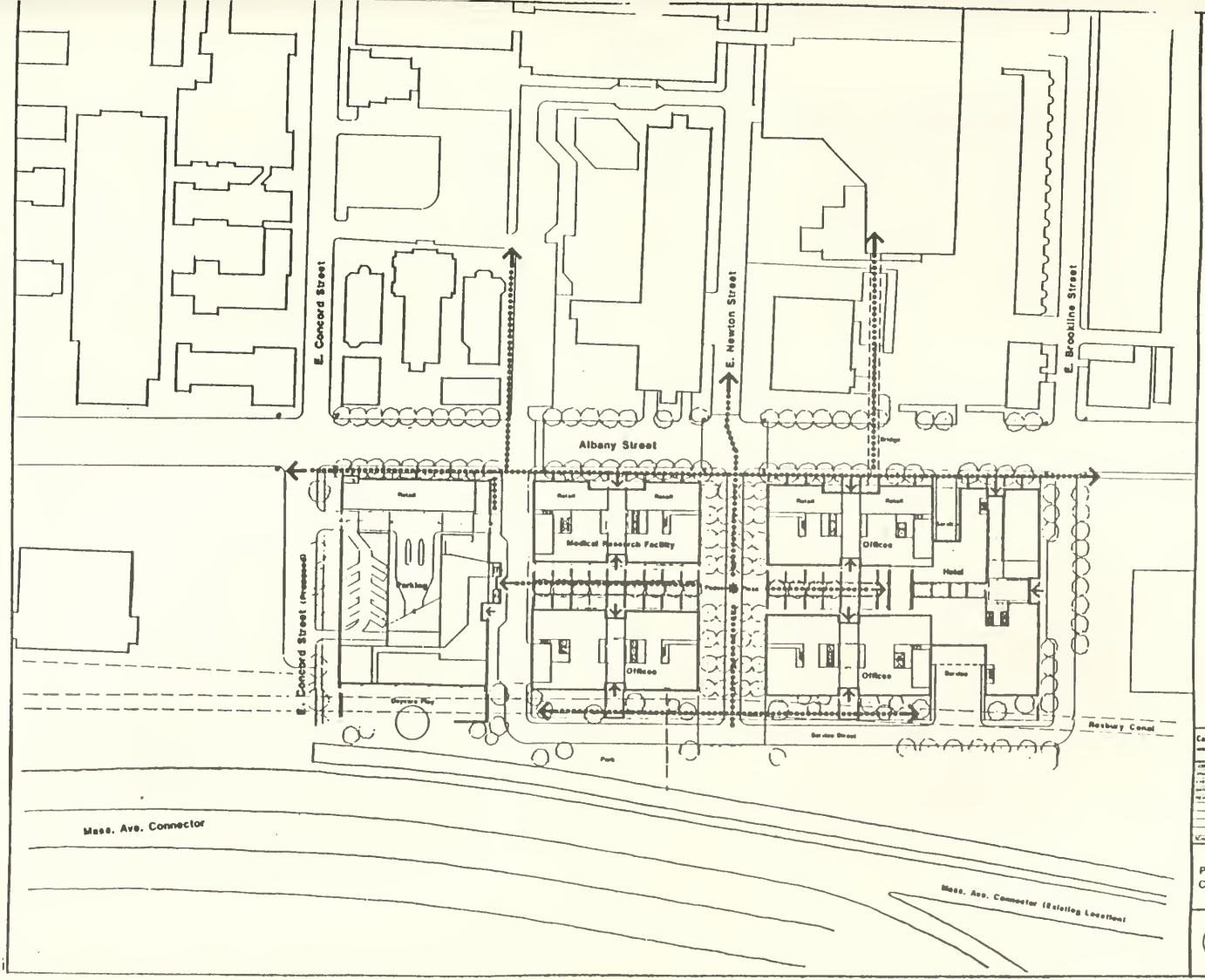
Service and Loading Plan

7



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Pedestrian
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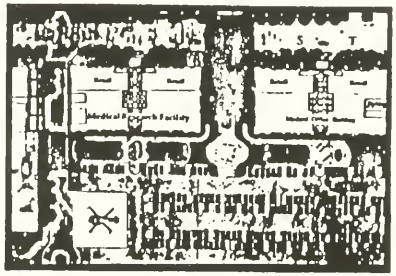
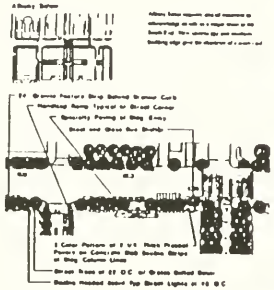
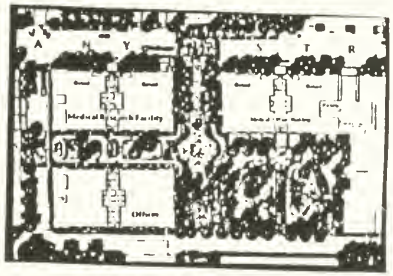


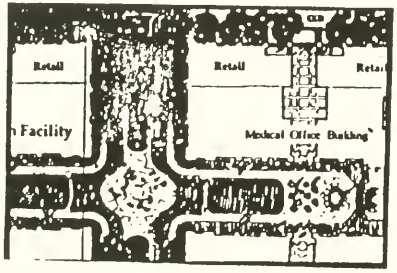
Phase I Landscape Plan



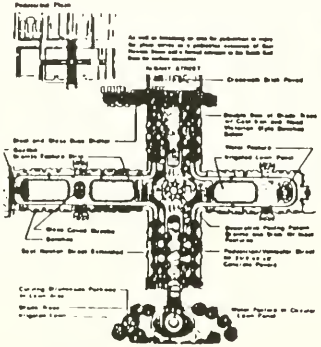
Albany Street Landscape Details



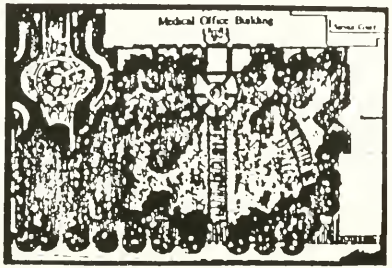
Phase II Option Landscape Plan



Phase I Plaza Detail



Pedestrian Plaza Landscape Details



Phase II Park Detail

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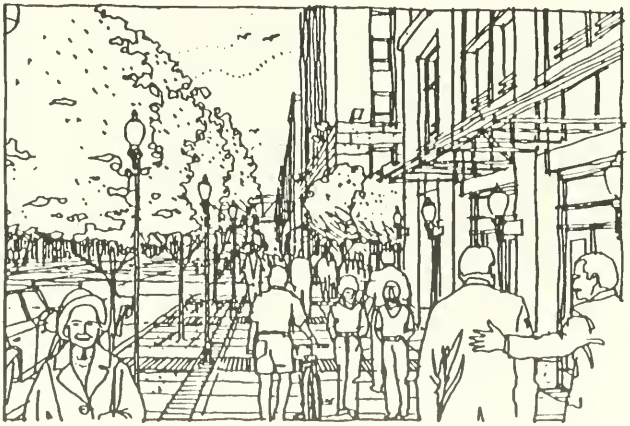
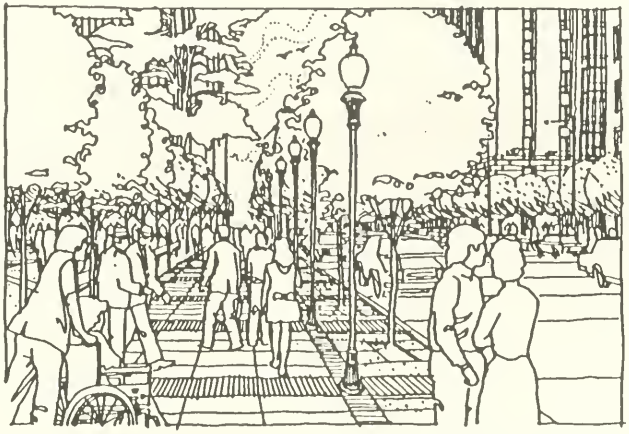


VIEW OF ALBANY ST. LOOKING NORTHEAST



VIEW OF ALBANY ST. LOOKING NORTHEAST

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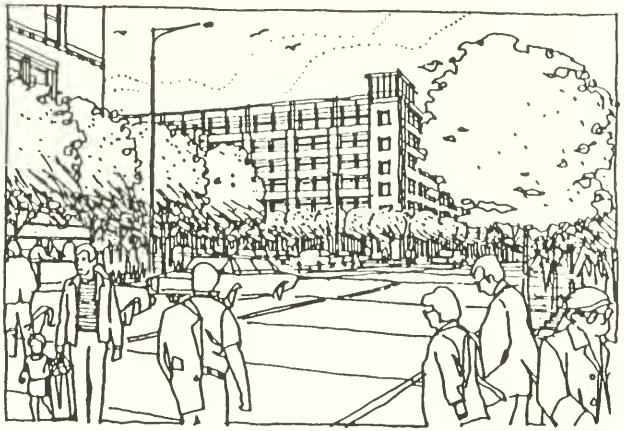
Cambridge Seven Associa

Site Photograph

10



VIEW OF PARKING GARAGE FROM
EAST CONCORD ST. LOOKING EAST

VIEW OF MEDICAL RESEARCH FACILITY FROM
EAST NEWTON ST. LOOKING SOUTHEAST

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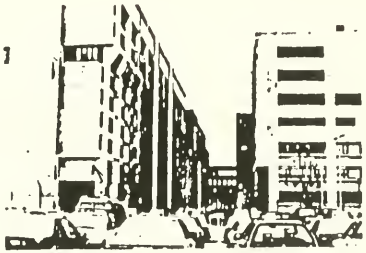
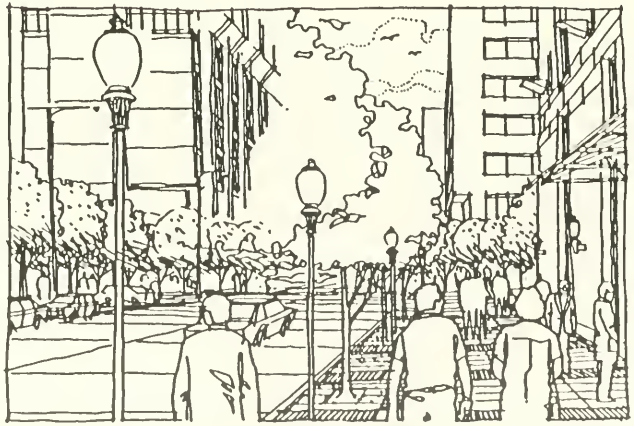
Associates

Cambridge Seven Associates

Site Photographs





VIEW OF EAST NEWTON ST. FROM
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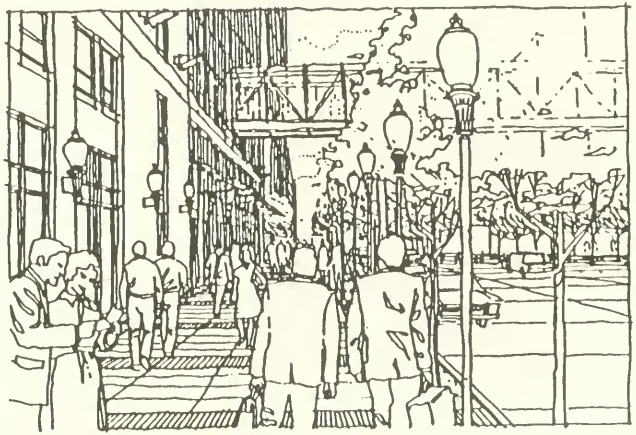
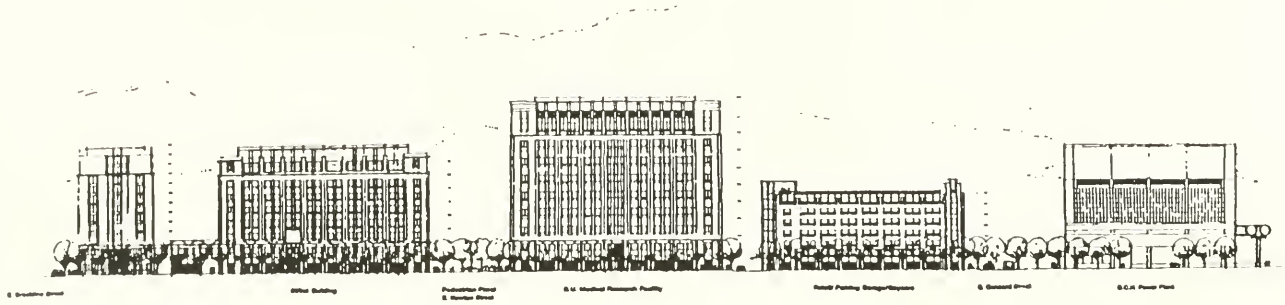


VIEW OF ALBANY ST. LOOKING SOUTHWEST

Cambridge Seven Associates,

Site Photographs



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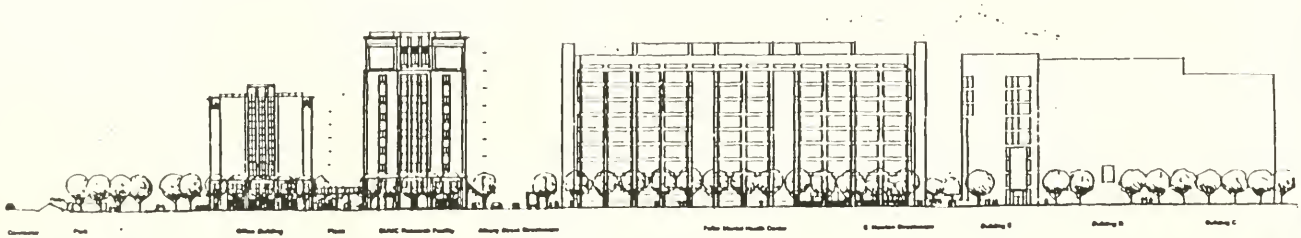

Section @ E. Newton Street

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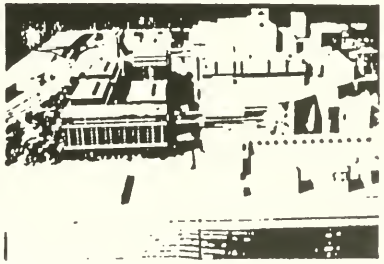
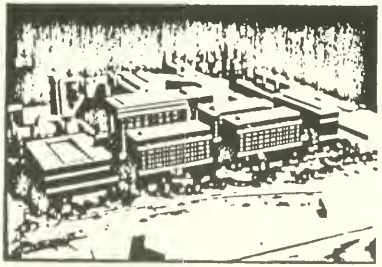
Elevations
and Sections

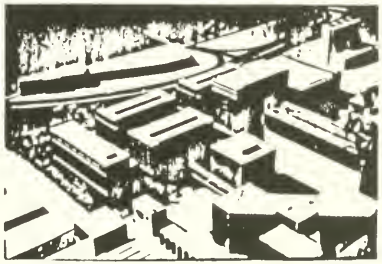
13



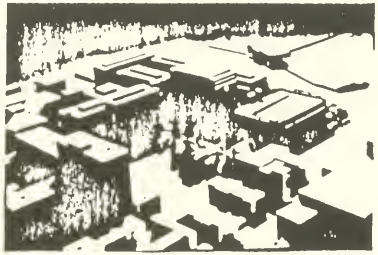
View from the West



View from the South



View from the North



View from the East

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Cambridge Seven Associ

Aerial Views

EXHIBIT C
to
MASTER PLAN
and
DEVELOPMENT PROJECT IMPACT PLAN
for
SOUTH END TECHNOLOGY SQUARE

LIST OF USES

USE NO.	DESCRIPTION	STATUS	
15	Hotel; motel; apartment hotel.	Allowed	A
16A	College or University granting degrees by authority of the Commonwealth of Massachusetts.	Conditional	C
17	Day care center; nursery school; kindergarten.	Allowed	A
18	Trade, professional or other school.	Conditional	C
22	Hospital or sanatorium not providing custodial care for drug addicts, alcoholics or mentally ill or mentally deficient persons; clinic or professional offices accessory to a hospital or sanatorium whether or not on the same lot.	Conditional	C
24	Scientific research and teaching laboratories not conducted for profit and accessory to Use Item No. 16, 16A, 18, 22, or 23, whether or not on the same lot, provided that all resulting cinders, dust, flashing, fumes, gases, odors, refuse matter, smoke and vapor are effectively confined to the lot or so disposed of as not to be a nuisance or hazard to health or	Conditional (Allowed	C A)

USE NO.	DESCRIPTION	STATUS	
	safety; and provided also that no noise or vibration is perceptible without instruments more than fifty feet from the lot or any part of the lot.		
27	Open Space in private ownership for active or passive recreational use or for the conservation of natural resources.	Allowed	A
30	Private Club (including quarters of fraternal organizations) operating for members only.	Allowed	A
34	Store primarily serving the local retail business needs of the residents of the neighborhood but not constituting a business as described in Use Item No. 34A, including but not limited to, store retailing one or more of the following: food, packaged alcoholic beverages, drugs, tobacco products, clothing, dry goods, books, flowers, paint, hardware and minor household appliances. (outdoor display)	Allowed Conditional	A C
36A	Sale over the counter, not wholly incidental to a use listed under Use Item No. 34 or Use item No. 37 or Use Item No. 50, of on-premises prepared food or drink for off-premises consumption or for on-premises consumption if, as so sold, such food or drink is ready for take-out	Conditional	C
37	Lunch room, restaurant, cafeteria or other place for the service of sale of food or drink for on-premises consumption, provided that there is no dancing nor entertainment other than phonograph, radio and television, and that neither food nor drink is served to, or consumed by, persons while seated in motor vehicles	Allowed	A

USE NO.	DESCRIPTION	STATUS	
37A	The maintenance and operation of any amusement game machine in a private club, dormitory, fraternity or sorority house, or similar non-commercial establishment (other than as an accessory use described in Use Item No. 86a)	Allowed	A
38	Place for sale and consumption of food and beverages (other than drive-in restaurant) providing dancing or entertainment or both	Allowed	A
39	Office of accountant, architect attorney, dentist, physician or other professional person, not accessory to a main use	Allowed	A
39A	Clinic not accessory to a main use	Allowed	A
40	Real estate, insurance or other agency office	Allowed	A
41	Office building, post office, bank (other than drive-in bank) or similar establishment	Allowed	A
43	Barber shop; beauty shop; shoe repair shop; self-service laundry; pick-up and delivery station of laundry or dry-cleaner; or similar use	Allowed	A
44	Tailor shop; hand laundry; dry cleaning shop	Allowed	A
48	Research laboratory; radio or television studio	Allowed	A
58	Parking Lot	Conditional	C
59	Parking Garage	Conditional	C
60	Repair Garage, gasoline service station, car wash	Conditional	C

USE NO.	DESCRIPTION	STATUS	
61	Rental agency, storing, servicing, and/or washing rental motor vehicles and trailers	Conditional	C
66	Helicopter Landing Facility	Conditional	C
68	Manufacturing of Pharmacutial Products	Forbidden	F
71	Any use on a lot adjacent to, or across the street from, but in the same district as, a lawful use to which it is ancillary and ordinarily incident and for which it would be a lawful accessory use if it were on the same lot; any such use on such a lot in another district unless such use is a use specifically forbidden in such other district	Conditional	C
72	As an accessary use subject to the limitations and restrictions of Article 10, a garage or parking space for occupants, employees, customers, students and visitors; provided that, in the case of a lot lying in two or more districts, such parking is accessory to a use that is lawful in the district in which such parking is located	Conditional	C
77	As an accessory use subject to the limitations and restrictions of Article 10, the keeping of laboratory animals incidental to an educational or institutional use, provided that all resulting noise, dust, fumes, gases, odors and refuse matter are effectively confined to the lot or so disposed of as not to be a nuisance or hazard to health or safety	Conditional	C
80	As an accessory use subject to the limitations and restrictions of Article 10, the storage of flammable liquids and gases incidental to a lawful use	Allowed	A

USE NO.	DESCRIPTION	STATUS	
85	As an accessory use subject to the limitations and restrictions of Article 10, any use ancillary to, and ordinarily incident to, a lawful main use	Allowed	A

or any other allowed use for a B-4 district.

EXHIBIT D

PARCEL 46B

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding ("MOU") is made this day of _____, 1991, by and between the City of Boston ("City"), acting by and through its Public Facilities Department ("PFD") and University Associates, a Massachusetts limited partnership, ("University").

WITNESSETH THAT:

WHEREAS, the City through its various agencies and through the Boston Redevelopment Authority ("BRA") has long planned to sell to private development interests that property known as Parcel 46B in order to accomplish urban renewal objectives of the City, as evidenced by a certain Cooperation Agreement dated March 15, 1967 between the BRA and the Boston University Medical Center ("BUMC") which provides for the acquisition of Parcel 46B by the BRA and for the sale of Parcel 46B by the BRA to BUMC, its successors and assigns; and also evidenced by a resolution adopted on September 29, 1983, in which the BRA tentatively designated University, the successor in interest to BUMC, as redeveloper of Parcel 46B for the phased development of 850,000 square feet of medical research and office space, retail space, a hotel and a 1,000 space parking garage ("Project"); and

WHEREAS, the BRA issued a Request For Proposals under the provision of Chapter 30B for the disposition of Parcel 46B, and University was selected as developer; and

WHEREAS, a portion of Parcel 46B is presently used as a parking lot by the City of Boston Department of Health and Hospitals ("DHH") for its employees ("DHH Parking Lot") as assured by a certain November 8, 1989 letter from Stephen Coyle, director of the BRA, to Mary Nee, Director of the City of Boston Mayor's Office of Capital Planning, and the remaining portion of Parcel 46B is used as a parking lot by BUMC ("BUMC Parking Lot A") for its purposes pursuant to a License Agreement with PFD dated October 1, 1989; and

WHEREAS, PFD has care, custody and control of that portion of Parcel 46B owned in fee by the City of Boston and by agreement with the BRA is responsible for the coordination of all City of Boston approvals necessary for the sale of Parcel 46B to University and the Project that will occur on Parcel 46B; and

WHEREAS, the City of Boston in connection with the construction of the new Boston City Hospital Inpatient Care Facility through the issuance of revenue bonds insured by the United States Department of Housing and Urban Development ("HUD") acting by and through the Federal Housing Commissioner ("FHA") has granted a mortgage on the portion of Parcel 46B upon which the DHH Parking Lot is located; and

WHEREAS, in order to undertake and complete the Project, University will be required upon acquisition of Parcel 46B to relocate the parking spaces contained within the DHH Parking Lot; and

WHEREAS, PFD acknowledges that the relocation of the parking spaces contained within the DHH Parking Lot is required for the Project and has agreed to cooperate with University to accomplish such relocation; and

WHEREAS, PFD also acknowledges that the undertaking of the Project will require the release of the mortgage on the DHH Parking Lot and the approval of such release by the Bond Trustee and by the appropriate federal agencies, including but not limited to HUD, FHA, and the Department of Health and Human Services ("HHS"); and

WHEREAS, the parties desire to specify their mutual undertakings for implementing the relocation of the parking, the release of the mortgage on the DHH Parking Lot and the approval of such release by the federal agencies and to specify the parties' respective rights and obligations.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained, the parties agree as follows, for themselves and for their respective successors and assigns:

1. The parties acknowledge that there are currently 481 parking spaces and a helipad within the DHH Lot, 633 parking spaces within the BUMC Lot A and 1250 parking spaces within the BUMC lot located to the rear of the Flower Market area off Albany Street ("BUMC Lot C").

2. University shall provide to DHH replacement parking on a one to one ratio for each parking space in the DHH Parking Lot which will be eliminated by the development of the Project and

shall also provide for the relocation of the helipad to a relocation acceptable to University Hospital and DHH. University shall be responsible for the coordination of approvals for such relocation, including but not limited to consultation with University Hospital, DHH and the operator of the helicopter service, and shall be responsible for all costs incurred in connection with the relocation of the DHH parking spaces and the helipad. The relocation of the DHH parking spaces and the helipad is shown on the plans prepared by Vanasse Hangen Brustlin entitled : " ", attached hereto as Exhibit A.

3. The replacement DHH parking spaces as described above shall be located on land owned or controlled by University and shall be situated so as not to diminish the access currently enjoyed by DHH employees.

4. The parties acknowledge that it will be necessary to enter into leasing, licensing or other agreements, which will be subject to federal and City review where required, with respect to the use and occupancy by DHH of portions of Parcel 46B and other land owned by University, and therefore the parties agree to enter into such agreements as may be necessary to accomplish the objectives set forth herein and the development of Parcel 46B. The parties acknowledge that one of such agreement shall described a relationship whereby University grants to the City through the care, custody and control of DHH the right to use pursuant to a lease the appropriate parking spaces for a term not to exceed 30 years, provided however such term may be extended

for such additional period as may be required by HUD and/or HHS in connection with the revenue bond financing on the Boston City Hospital Inpatient Care Facility, at the rate of one dollars ($1) per year. The City shall have the option to renew such lease for an additional period of 20 years at the same amount then being charged to other users of similar parking spaces. University will require that its lender enter into attornment and non-disturbance agreements with the City, so that the City's lease for parking as referenced herein will not be adversely affected by a default by University of its obligations to its lender.

5. University shall provide PFD with sixty (60) days notice of the planned commencement of construction of each phase of the Project. Such notice shall include a time schedule setting forth in detail the sequencing of any required location transfer of DHH parking spaces. The notice shall also include detailed operating procedures developed in consultation with DHH for the implementation of directional signage and delineation by striping of the parking areas allocated for DHH employees.

6. The agreement described in paragraph 4 above shall also include detailed operating procedures for the DHH parking spaces prepared in consultation and agreement with DHH. Such procedures shall include provision for management, maintenance, security and lighting, as well as other provisions necessary for the operation of the parking spaces as reasonably required by DHH.

7. Immediately upon the execution of this agreement, the Collector-Treasurer of the City of Boston, acting as mortgagor, shall transmit to the appropriate federal agencies and the holder of the mortgage on the DHH Parking Lot a request for the approval of the release of such mortgage. The City and University shall cooperate in joint efforts to effectuate such approval in order to proceed with the Project.

8. University shall be responsible for the payment of costs not to exceed $400,000.00 incurred by either PFD or other City departments in securing the mortgage release and parking relocation process.

9. Any notice required or desired to be given pursuant to this MOU shall be in writing with copies directed as indicated below and shall be personally served, or, in lieu of personal service, service may be made by depositing same in the United States mail, postage prepaid, certified or registered mail. If such notice shall be addressed to PFD, the address of the PFD is:

Director
Public Facilities Department
26 Court Street
Boston, Massachusetts 02108

with copies to:

Paul D. Roche, Esquire
General Counsel
Public Facilities Department
26 Court Street
Boston, Massachusetts 02108

and if addressed to University, the address of University is:

University Associates
c/o Robert F. Walsh
307 West First Street
South Boston, Massachusetts 02127

with copies to:

James H. Greene, Esquire
Rubin and Rudman
50 Rowes Wharf
Boston, Massachusetts 02110

Either PFD or University may change its respective address by giving written notice to the other in accordance with the provisions of this Paragraph.

10. No principal, general partner or limited partner of University shall have any personal liability for the obligations of University under this MOU. No member, official or employee of the City shall be personally liable to University in the event of any default or breach by the City or for any amount which may become due to University or on any obligations under the terms of this MOU.

11. Except as otherwise specifically provided in this MOU, whenever. under this MOU approvals, authorizations, determinations, satisfactions or waivers are required or permitted, such approvals, authorizations, determinations, satisfactions or waivers and shall be effective and valid only when given in writing signed by a duly authorized officer of the City or University.

12. The rights and obligations of the parties hereto shall be binding upon and shall inure to the benefit of the respective successors and assigns of the parties hereto.

13. Recognizing that the parties may find it necessary to establish to third parties the then current status of performance hereunder, either party, on the written request of the other made from time to time, will promptly furnish a written statement on the status of any matter pertaining to this MOU within a reasonable time.

14. This MOU shall be governed by the laws of the Commonwealth of Massachusetts.

IN WITNESS WHEREOF, the parties have caused this MOU to be executed under seal and delivered and their respective corporate seals affixed by duly authorized and acting officers on the day and year first above written.

CITY OF BOSTON ACTING BY AND
THROUGH ITS PUBLIC FACILITIES
DEPARTMENT

By:_____

UNIVERSITY ASSOCIATES

By:_____
Title

BOSTON REDEVELOPMENT AUTHORITY

DEVELOPMENT PLAN

for

TECHNOLOGY SQUARE GARAGE

within

PLANNED DEVELOPMENT AREA NO. 41

SOUTH END TECHNOLOGY SQUARE

University Associates Limited Partnership, Developer

September 10, 1991

Development Plan: Simultaneously herewith, the Boston Redevelopment Authority ("BRA") has approved the Master Plan for Planned Development Area No. ("Master Plan PDA") and the Development Impact Project Plan for the Master Plan PDA for South End Technology Square. As referenced in the Master Plan PDA, two or more development plans for projects within the Master Plan PDA would be submitted to the BRA for approval. In accordance with Section 3-1A of the Boston Zoning Code (the "Code"), this development plan sets forth information on the development of the Technology Square Garage ("Project" or "Garage"), including the proposed location and appearance of structures, open spaces and landscaping, the proposed uses of the Project, the proposed dimensions of the structure, the proposed density, the proposed traffic circulation, parking and loading facilities, access to public transportation and other major elements of the Project (the "Development Plan"). A Development Impact Project Plan has been filed with the Master Plan PDA pursuant to the requirements of Articles 26 and 26B of the Code. While the retail and day care areas of the Project are subject to the requirements of said Articles, the parking areas of the Project are not, in so far as a parking garage use is not included in Table C of Section 26-3, nor Table E of Section 26B-3, and such use does not directly result in a reduction in the supply of low and moderate income dwelling units.

Developer: The developer of the Project is University Associates Limited Partnership, a Massachusetts limited partnership to be formed, the general partners of which will be the Trustees of Boston University, a Massachusetts non-profit educational corporation, and Univer Development Foundation, Inc., a Massachusetts non-profit corporation, its successors and assigns (the "Developer").

Site: The Project will be constructed on that certain parcel of land shown as Parcel A within PDA No. 41, containing approximately 91,411 square feet (2.08 acres) and located at 710 Albany Street, Boston, Suffolk County, Massachusetts, as more particularly bounded and described in Exhibit A attached hereto and as shown on the plan entitled "University Associates Development Plan in Boston, Mass (South End District) dated May 2, 1991, revised August 5, 1991, prepared by Bryant Associates, Inc. and included in Exhibit B to the Master Plan PDA and as shown on the set of plans entitled: "Development Plan for Retail/Daycare/Parking Facility, University Associates, Developer", dated August 2, 1991, prepared by Zaldastani Associates, Inc. ("Development Plans"), copies of which are attached hereto as Exhibit B, (the "Site" or "Property").

Proposed Location and Appearance of Structure: The Project consists of a structure used for off-street parking, retail activity, day care and/or recreational activities. The Building contains approximately 6,500 square feet of retail use and approximately 12,300 square feet of day care and/or recreational use on the first floor level. It has a 44,000 square-foot footprint and a roof elevation of 80 feet with elevator and stairway penthouse structures. Of the seven levels of parking, there are approximately 147 parking spaces on each parking level with the exception of the second level on which there are 101 parking spaces. Access to the day care and/or recreational areas will be from the perimeter service or loop road, as well as another access road on the west side of the Site, which will eventually become an extension of East Concord Street to the new Massachusetts Avenue connector upon the completion of the Central Artery project. Plans also include an open, outdoor play area which is to be suitably screened and landscaped for the day care center. The location of the garage retail area is aligned with the retail areas in the medical research building and Doctors' office/clinic building ("Medical Arts Building") on Albany Street, and it will serve the needs of the Project as well as those of the medical complex and the neighborhood. The day care center is located away from the Albany Street traffic on the opposite side of the building. This location allows for a large, secure outdoor play area as well as the opportunity to connect with the park proposed along the Massachusetts Avenue connector. The design of the structure segregates parking garage traffic from the day care activities, which are to be served by separate pick-up and drop-off points.

The location of the Garage on the southern portion of the Site will provide a focal point from the pedestrian plaza as well as Albany Street. The Garage will be used by occupants of the medical research building and the Medical Arts Building as well as the hotel on the Master Plan PDA Site. Since site conditions may prevent the development of parking within the medical research building and the Medical Arts Building, this Garage will be an accessory use and/or ancillary use to all buildings within the Master Plan PDA.

The appearance of the Garage is shown on the attached Development Plans which contain elevations of the structure as well as a detailed rendering of the exterior materials of the Garage. The materials are to consist of brick and stone with a stone base and pre-cast belt courses. The parking decks will have pre-cast spandrel with reveals and color-galvanized steel spandrels and railings. The first two levels of the Garage will have recessed stone work with decorative light fixtures and anodized aluminum sash windows. As shown on the Development Plans, the Albany Street elevation and the pedestrian plaza elevation will have glazed store fronts and arcade features. The building has been designed in keeping with the requirements of a garage facility, yet sensitive to the form and materials of the surrounding South End and institutional area. Elevations, floor plans and specific design elements of the building are subject to further design, environmental and other development review by the BRA and other governmental agencies, and thus there may be further refinements in the Development Plans.

Open Spaces and Landscaping: A landscaping and paving plan for the Project includes the sidewalk area on Albany Street and the creation of a portion of the pedestrian plaza which is referenced in the PDA Plans filed with the Master Plan PDA. Landscaping will be noted for its rich vocabulary in pavers, plantings, lighting, signage and other street furniture. The pedestrian plaza will include a combination of grass, large and small trees in a geometric pattern which will be coordinated with building entrance. The specific area of landscaping for the Project is shown on the Phase I Site Plan attached hereto as Exhibit B.

Proposed Uses for the Site and Structure: The proposed use of the Site and structure is essentially as shown on the Development Plans attached hereto as Exhibit B. Such plans show the use of the ground floor of the Garage for retail stores, day care use, interior access parking and drop-off point for day care, office use for the Garage operation and a system of ramps and toll plazas. The second, third, fourth, fifth, sixth, seventh floors and roof area are dedicated to parking. The surrounding ground plane of the Site will be landscaped and paved with materials suitable and compatible with the proposed pedestrian plaza as shown on the Landscaping Feature Plan in the Master Plan PDA. Additionally, it is proposed that an outdoor play area be

constructed on the southern portion of the Site, adjacent to the proposed day care center.

It is contemplated that the Project uses will be as follows:

Floor	Use
First	Parking, retail use, garage office and administrative facility, day care and recreational or health club use, outdoor play area
Second, Third, Fourth, Fifth, Sixth, Seventh Roof	Parking use

The proposed zoning uses for the Site and for the structure planned for the Site may include one or more of the following uses:

Use No.	Description	Status	
17	Day care center; nursery school; Kindergarten	Allowed	A
27	Open Space in private ownership for active or passive recreational use or for the conservation of natural resources.	Allowed	A
30	Private Club (including quarters of fraternal organizations) operating for members only.	Allowed	A
34	Store primarily serving the local retail business needs of the residents of the neighborhood but not constituting a business as described in Use Item No. 34A, including but not limited to, store retailing one or more of the following: food, baked goods, groceries, packaged alcoholic beverages, drugs, tobacco products, clothing, dry goods, books, flowers, paint, hardware and minor household appliances. (outdoor display)	Conditional (Allowed	C A)
36A	Retail catering	Conditional	C

37	Lunchroom/Restaurant	Allowed	A
39	Office of an accountant, architect, attorney, dentist physician or other professional person, not accessory to a main use	Allowed	A
40	Real estate office, insurance or other agency office	Allowed	A
41	Office building, post office, bank (other than drive-in bank) or other similar establishment	Allowed	A
43	Barber/beauty/shoe shop Services Establishments	Allowed	A
44	Tailor/Dry Cleaning	Allowed	A
58	Parking Lot	Conditional	C
59	Parking Garage	Conditional	C
60	Repair Garage, gasoline service station, car wash	Conditional	C
61	Car rental agency	Conditional	C
66	Helicopter Landing Facility	Conditional	C
71	Ancillary Uses	Conditional	C
72	Accessory Parking Use	Conditional	C
80	Storage of Flammable Liquid and Gases Incidental to a lawful use	Allowed	A
85	Accessory Use which is ancillary to and ordinarily incident to a lawful main use	Allowed	A

or any other allowed use for a B-4 district.

Proposed Dimensions of Structure: The Garage will be located on Parcel A of the Site containing approximately 91,411 square feet of site area. The building will have a footprint of 44,000 square feet and will be set back from Albany Street approximately 15 feet. The side yard set back from the service road for the Site will be approximately 10 feet. The main open areas on Parcel A will be the areas between the Garage and the

Center for Advanced Biomedical Research on the north side and the area to the rear of the Garage which will be an open recreational area intended for the day care center. The gross floor area of the building will be approximately 370,800, and based upon the parcel size of 91,411 square feet, the floor area ratio equals 4.0. This may require an Exception from the provisions of the Code. Upon establishment of the Master Plan PDA, the Site will be located in a B-4-D zoning district. In such districts, relief from the requirements of the Code may be sought as Exceptions pursuant to Article 6A of the Code. Because the design of the Project is subject to further design, environmental and other development review by the Authority and other governmental agencies and authorities, the zoning relief required for the Project may change due to such review.

Proposed Density and Zoning: This Development Plan provides for an overall FAR for the Site of 4.0 based upon the ratio of 370,800 square feet of gross floor area of Project to the total Site area of approximately 91,411 square feet. However, the actual FAR calculated in accordance with the technical definitions of "gross floor area," "floor area ratio" and "Lot area" in the Code may be greater than 4.0. For example, roadways, sidewalks, pathways and other paved areas forming the pedestrian plaza and the extension of East Concord Street may be excluded from the definition of "lot area" in the Code. Accordingly, the "lot area" used to calculate FAR in accordance with the Code may not include the entire 91,411 square feet of land area. As referenced in the Master PDA, the entire Master Plan PDA Site will be subdivided into various development parcels for sale or lease to users and developers of the various parcels. Therefore, it will be necessary to insure that the proposed density for Parcel A is not affected by changes in the densities of other parcels and building plans within the Master Plan PDA. Although the total proposed parcel density is 4.0 and the total proposed Master Plan PDA Site density is 3.2, these ratios may change due to design and development review by the authority and other governmental agencies and authorities.

Due to the location and size of the Garage and the need to establish separate development parcel for the development and financing of the Garage, it is contemplated that certain provisions of the Code will not be met by the Project design. Therefore, pursuant to Article 6A of the Code, Exceptions may be granted by the Board of Appeal for projects located within planned development areas and urban renewal subdistricts. It is contemplated that, based upon the present development plans for the Garage, the following Exceptions are needed from the provisions of the Code:

1. Conditional Use Permits or Exceptions Required for Article 8, Section 8-7, Uses;

USE NO.	DESCRIPTION	STATUS	
18	Trade, professional or other school.	Conditional	C
34	Store primarily serving the local retail business needs of the residents of the neighborhood but not constituting a business as described in Use Item No. 34A, including but not limited to, store retailing one or more of the following: food, packaged alcoholic beverages, drugs, tobacco products, clothing, dry goods, books, flowers, paint, hardware and minor household appliances. (outdoor display)	Allowed Conditional	A C
36A	Sale over the counter, not wholly incidental to a use listed under Use Item No. 34 or Use item No. 37 or Use Item No. 50, of on-premises prepared food or drink for off-premises consumption or for on-premises consumption if, as so sold, such food or drink is ready for take-out	Conditional	C
58	Parking Lot	Conditional	C
59	Parking Garage	Conditional	C
60	Repair Garage, gasoline service station, car wash	Conditional	C
61	Rental agency, storing, servicing, and/or washing rental motor vehicles and trailers	Conditional	C
66	Helicopter Landing Facility	Conditional	C
71	Any use on a lot adjacent to, or across the street from, but in the same district as, a lawful use to which it is ancillary and ordinarily incident and for which it would be a lawful accessory use if it were on the same lot; any such use on such a lot in another district unless such use is a use specifically forbidden in such other district	Conditional	C
72	Accessory Parking	Conditional	C

2. Exceptions Required for Dimensional Requirements.

Article 2,	Section 2-1	Area and Lot Definitions
Article 15,	Section 15-1	Floor Area Ratio
Article 19,	Section 19-1	Minimum Side Yard
Article 20,	Section 20-1	Minimum Rear Yard
Article 21,	Section 21-1	Minimum Setback Requirements
Article 24,	Section 24-1	Off-Street Loading Requirements

Projected Number of Employees: It is anticipated that the Project will generate approximately 500 construction jobs. With respect to permanent jobs, based upon the current development scheme, approximately 40-50 jobs will be created.

Proposed Traffic Circulation: The present use of the Site as a parking lot generates traffic from Albany Street and Massachusetts Avenue to two main parking lot within the Site. Albany Street will continue to be the main access road to the garage, until the completion of the Central Artery Project. As set forth in the Master Plan PDA, the access road from Albany Street to the Garage will be extended to the new Massachusetts Avenue connector upon completion of the Central Artery Project. The proposed East Concord Street extension will allow traffic to access the Garage from the Massachusetts Avenue connector, but the use of the extension will be limited so that vehicles may not access Albany Street from such extension. Vehicles exiting the Garage onto the extension will be restricted to a left turn only to the Massachusetts Avenue connector. Other access to the Garage will be from the perimeter service or loop road from Albany Street. Both access points are shown on the Development Plans attached hereto as Exhibit B.

Parking and Loading Requirements: Pursuant to the provisions of the Code, garage use is exempt from parking and loading requirements and the retail area, as well as the day care and/or recreational club area, are below the floor area requirements for off-street loading. However, parking for the retail stores as well as day care and/or recreational use will be provided for in the Garage. As set forth herein, the Garage is developed specifically to serve the needs of the Project users in the medical research building, the Medical Arts Building, the hotel and other buildings contemplated to be developed within the Master Plan PDA Site. Additionally, the Garage will provide parking for Boston University Medical Center and the Department of Health and Hospitals. Loading areas sufficient for the use of the retail and day care areas will be located on the ground floor as shown on the Development Plans attached hereto as Exhibit B.

Access to Public Transportation: With the relocation of the Orange Line to the Southwest Corridor, the availability of rapid transit service to the Site has been reduced, although the MBTA has instituted bus service along Albany Street. The Developer intends to coordinate with the MBTA to promote the use of public

transportation, carpools, vanpools and the caravan system. The Project will be subject to a Transportation Access Plan Agreement which will outline specific strategies such as roadway and traffic control improvements, traffic demand management, public transportation, parking management, loading, pedestrian improvements and construction traffic management. The Project will also be subject to an Inter-institutional Transportation Management Association Agreement ("ITMA") which would have as its specific objective: the implementation of measures that minimize automobile use to and from the area. The ITMA will seek to accomplish this objective by: promoting the concept of ride sharing through project marketing efforts, implementing a computerized ride share program, establishing a public awareness program on transportation options, establishing a preferential parking program for carpools and vanpools, sponsoring a semi-annual transportation awareness day, promoting bicycle transportation and encouraging employers to implement alternative work schedules and to promote increase usage of public transportation services.

Public Benefits: The Project as part of the Master PDA will provide substantial public benefits to the City of Boston and the surrounding neighborhood. Not only will the Project provide direct benefits due to the development, construction and occupancy of the Project, but also the Project will insure continuation and strengthening of existing public benefits to the City and the neighborhood from the operation of the Medical Center. This Project is unique in the extent of public benefits in that it will ensure the continuation, strengthening and expansion of existing medical research institutions in the area. The extent of the community and public benefits are enumerated the Master Plan PDA. An additional benefit provided by this Project will be the reservation of one-third of the 100 spaces in the day care center to community residents and employees of Boston City Hospital.

In addition to these long-term and substantial benefits from the Project and its sponsors, the Project, as part of the Master Plan PDA, will participate in the Inter-institutional Transportation Management Association with the Medical Center and Boston City Hospital, will contribute to the maintenance program for Franklin Square, Blackstone Square and Worcester Square parks in conjunction with the Boston Parks Department, and will contribute to Housing Linkage based upon the contribution formula of $5.00 per square foot of floor area and Jobs Linkage based upon the contribution formula of $1.00 per square foot of floor area, both exclusive of garage space. As set forth herein, the linkage contribution for this Project will be limited to the retail and day care and/or recreational areas of the structure. The linkage contribution will be governed by the Development Impact Project Agreement entered into by the Developer of the Master Plan PDA and the BRA. The Project will provide public benefits in construction jobs, taxes, PILOT contributions and indirect economic benefits for the neighborhood and the City of Boston.

In summation, the Project as part of the Master Plan PDA and the DIP Plan and DIP Agreement will provide for the continuation and enhancement of numerous public benefits through the support of the medical research and institutional uses in the South End and the strengthening of such uses.

Development Review Procedures: All design plans for the Project are subject to on-going development review and approval of the BRA. Such review is to be conducted in accordance with Article 31 of the Code and the BRA Development Review Procedure, dated 1985, revised 1986, in the form attached to the Cooperation Agreement for the Site as defined and modified by such Cooperation Agreement.

LIST OF EXHIBITS
to
DEVELOPMENT PLAN
for
TECHNOLOGY SQUARE GARAGE

Exhibit A	Site Description
Exhibit B	"Development Plan for Retail/Daycare/Parking Facility, University Associates, Developer, August 1991, prepared by Zaldastani, Inc.

EXHIBIT A

PDA SITE DESCRIPTION

PARCEL "A"

A certain parcel of land in Boston, Suffolk County, Massachusetts, shown as Parcel "A" on a plan entitled "University Associates Development Plan in Boston, Mass. (South End District)," prepared by Bryant Associates, Inc., dated May 2, 1991, revised August 5, 1991, scale 1" = 40', to be recorded with the Boston Redevelopment Authority for the Master Plan and Development Impact Project Plan for Planned Development Area No. 41 pursuant to Article 3, Section 3-1A of the Boston Zoning Code, and bounded and described according to said plan as follows:

Beginning at a point on the southeasterly side of Albany Street at the northwesterly corner of said Parcel "A" as shown on said plan, and thence running

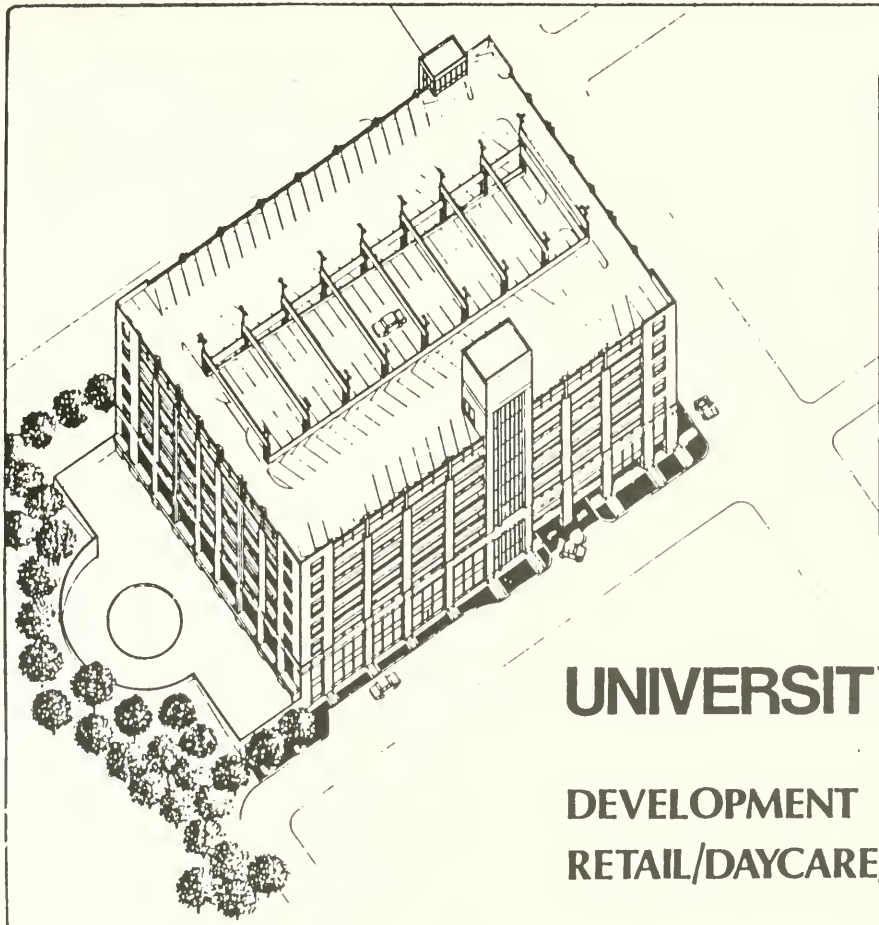
NORTH 45° 56' 20" EAST by Albany Street for a distance of two hundred ninety-five and 50/100 (295.50) feet; thence turning and running

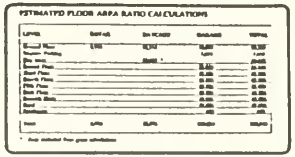
NORTH 44° 03' 40" WEST for a distance of three hundred thirty-three and 18/100 (333.18) feet; thence turning and running

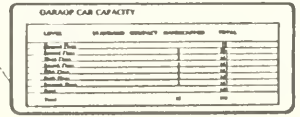
SOUTH 55° 06' 9" WEST for a distance of two hundred ninety-nine and 32/100 (299.32) feet; thence turning and running

SOUTH 44° 03' 40" EAST for a distance of two hundred eighty-five and 51/100 (285.51) feet to the point of beginning;

Containing 91,411 square feet of land (more or less), according to said plan.





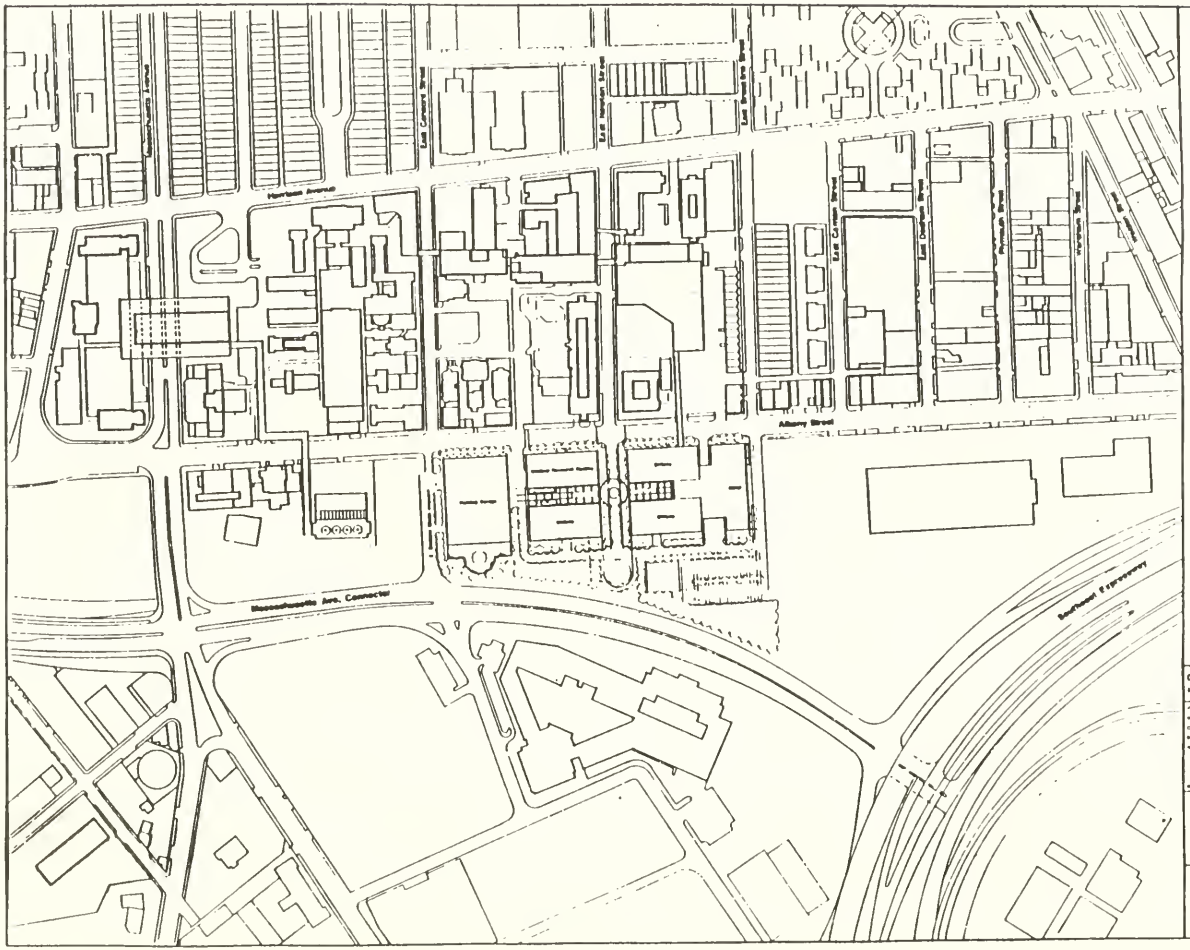


UNIVERSITY ASSOCIATES

DEVELOPMENT PLAN FOR RETAIL/DAYCARE/PARKING FACILITY

ALBANY ST. BOSTON MASSACHUSETTS

ZAIDASTAMI ASSOCIATES INC



University Associates

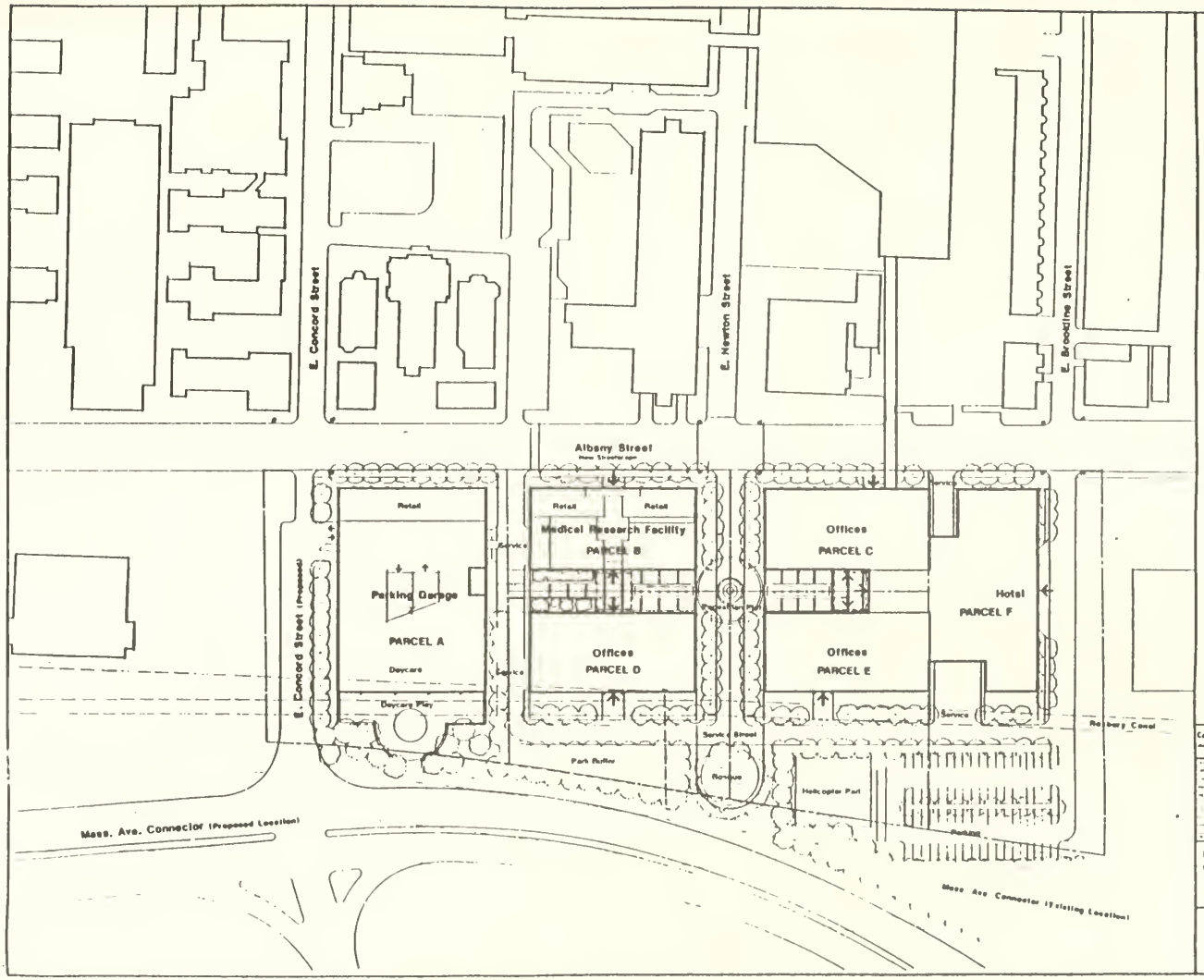
Cambridge Seven Associates, Inc.

1" = 100'

MASTER PLAN

Site Plan

L-1

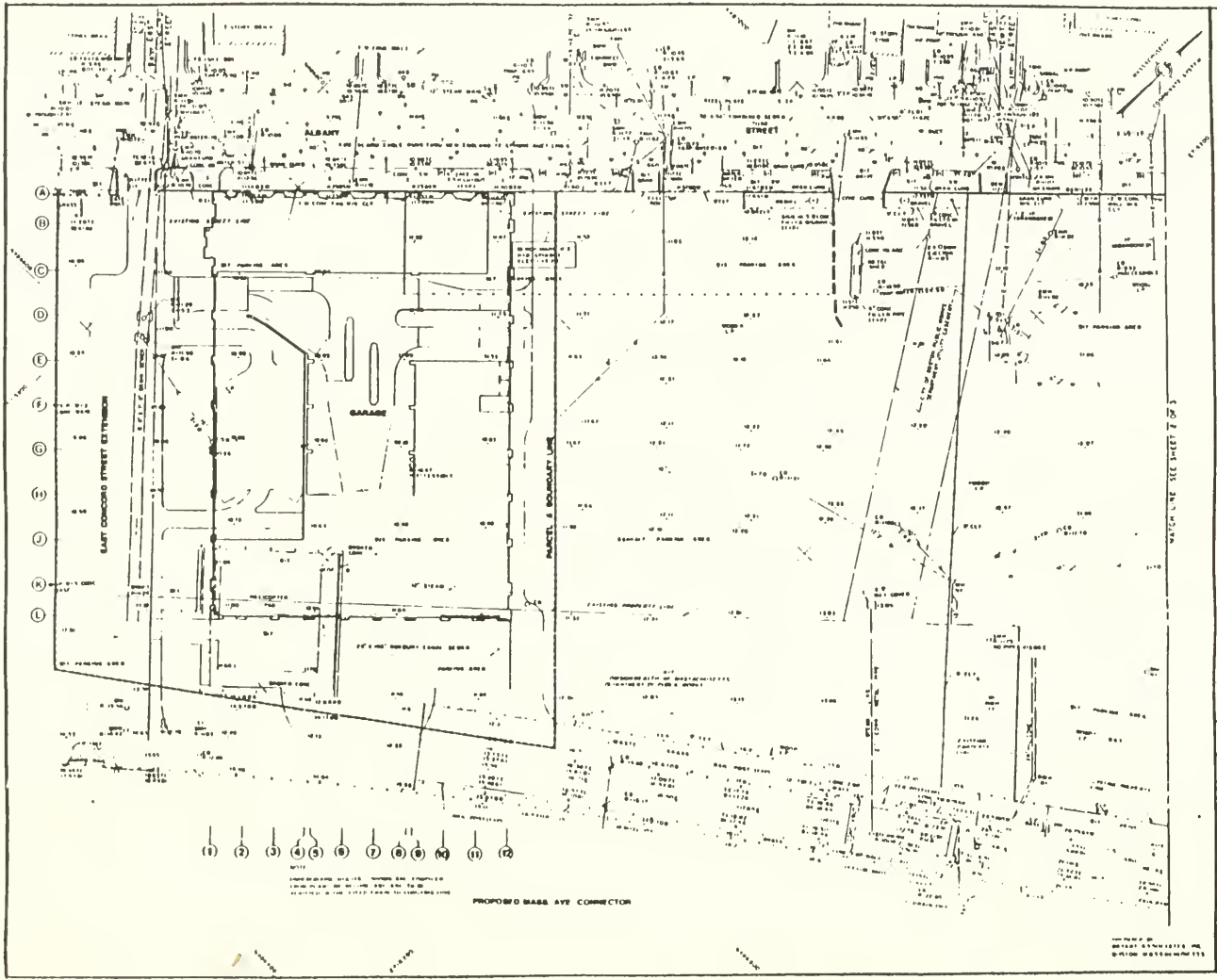


University Associates

Cambridge Seven Associates, Inc.

MASTER PLAN
Grade Level Plan

L-2



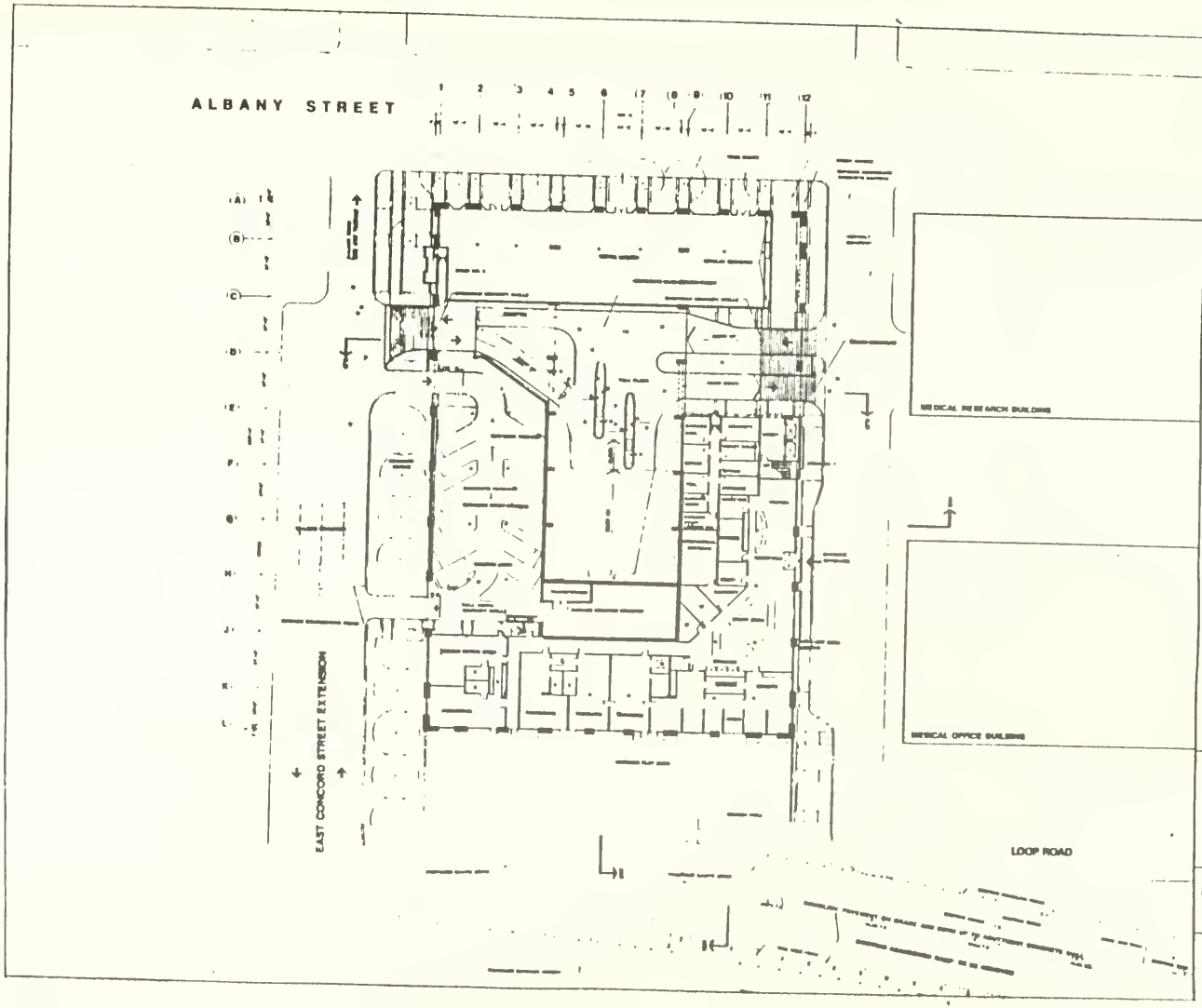
University Associates

Cambridge Seven Associates, Inc.

GARAGE

EXISTING CONDITIONS

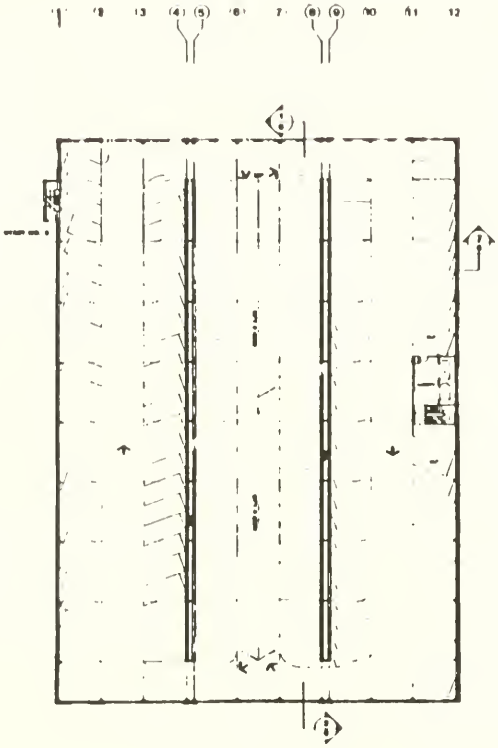
L-3



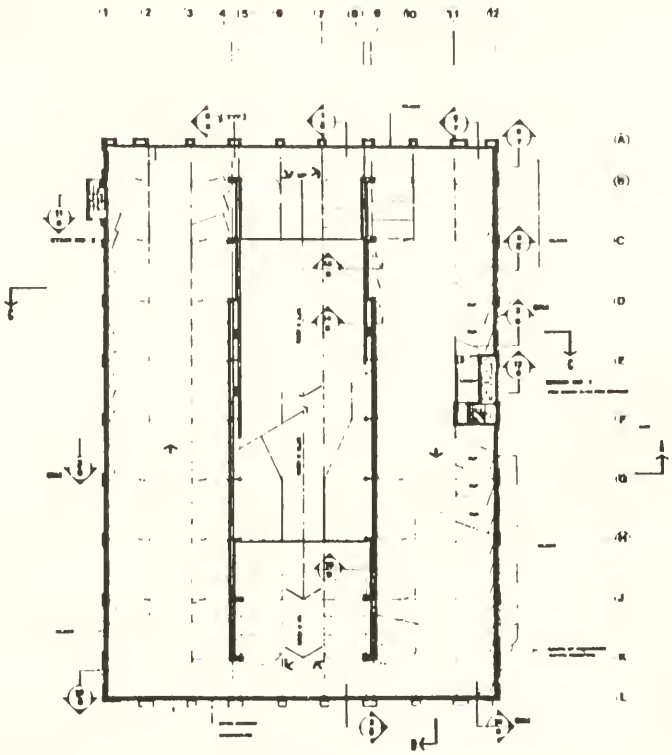
University Associates

GARAGE
Ground Floor Plan

1



3RD., 4TH. & 5TH. FLOOR PLAN
141 CARS

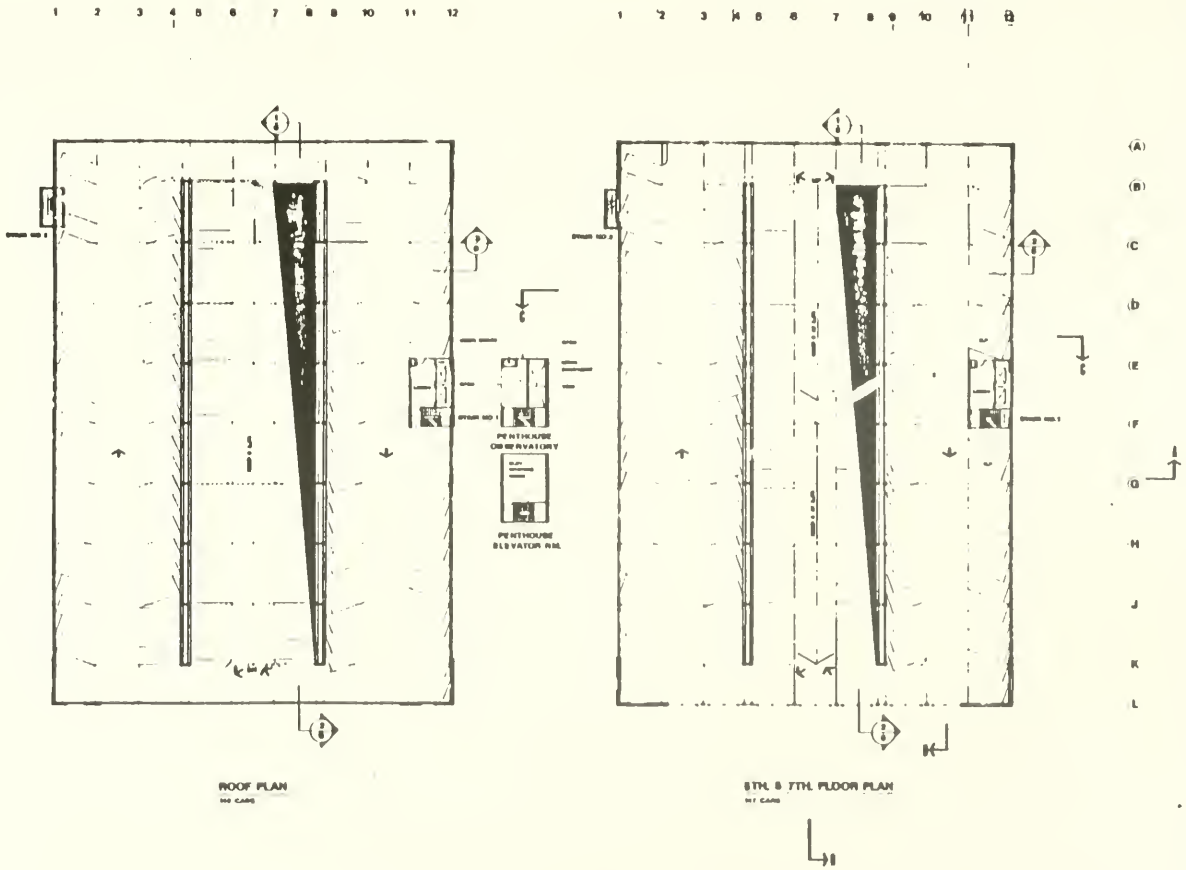


2ND. FLOOR PLAN
161 CARS

University
Associates

GARAGE
2nd., 3rd., 4th. & 5
Floor Plans

2

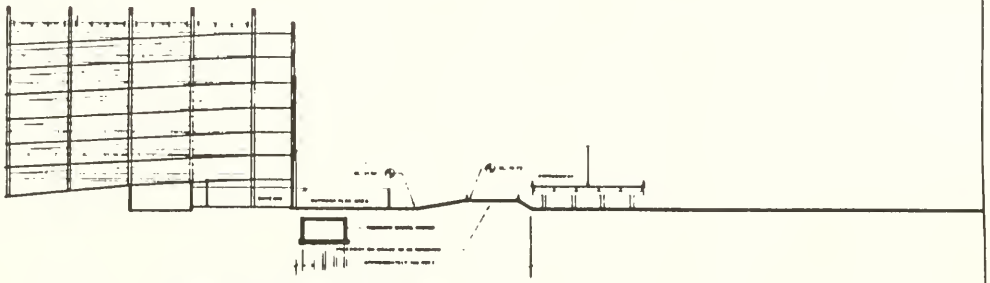


University Associates

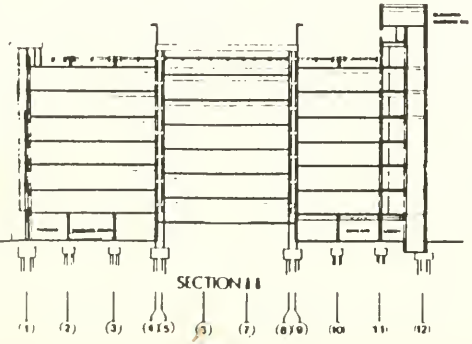
GARAGE
6th., 7th. & Roof Floor Plans

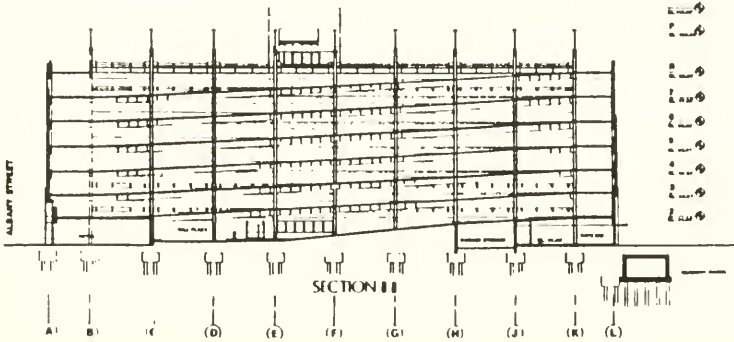
3

University Associates



SECTION THRU EXPRESSWAY AND RAMP

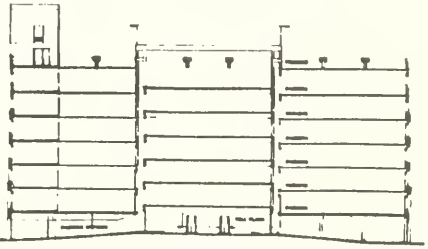


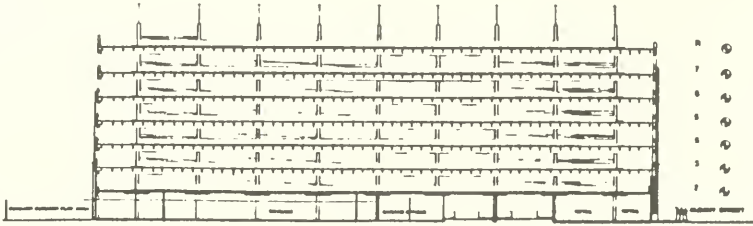


GARAGE
Sections

4

University
Associates





GARAGE
Sections

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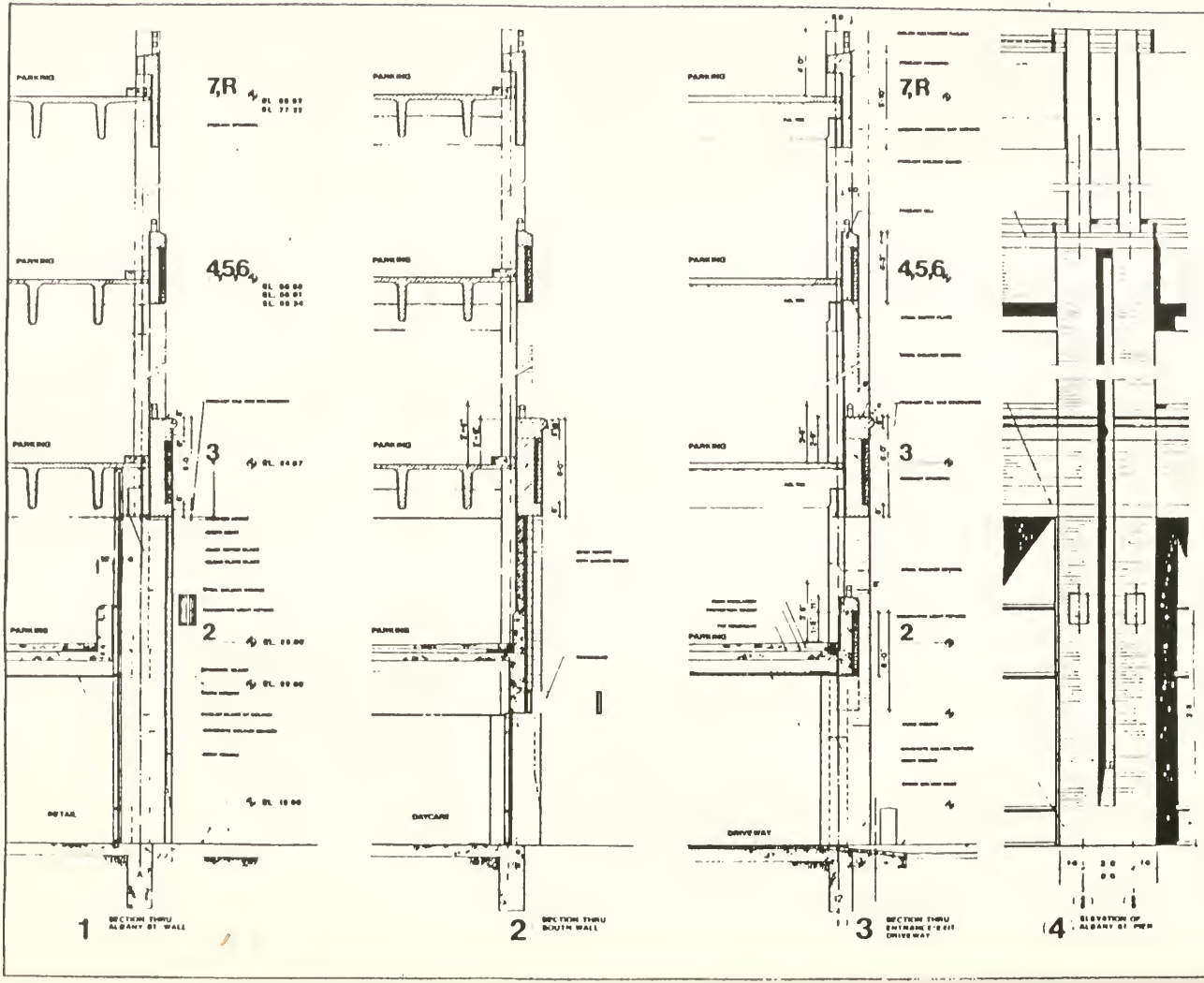
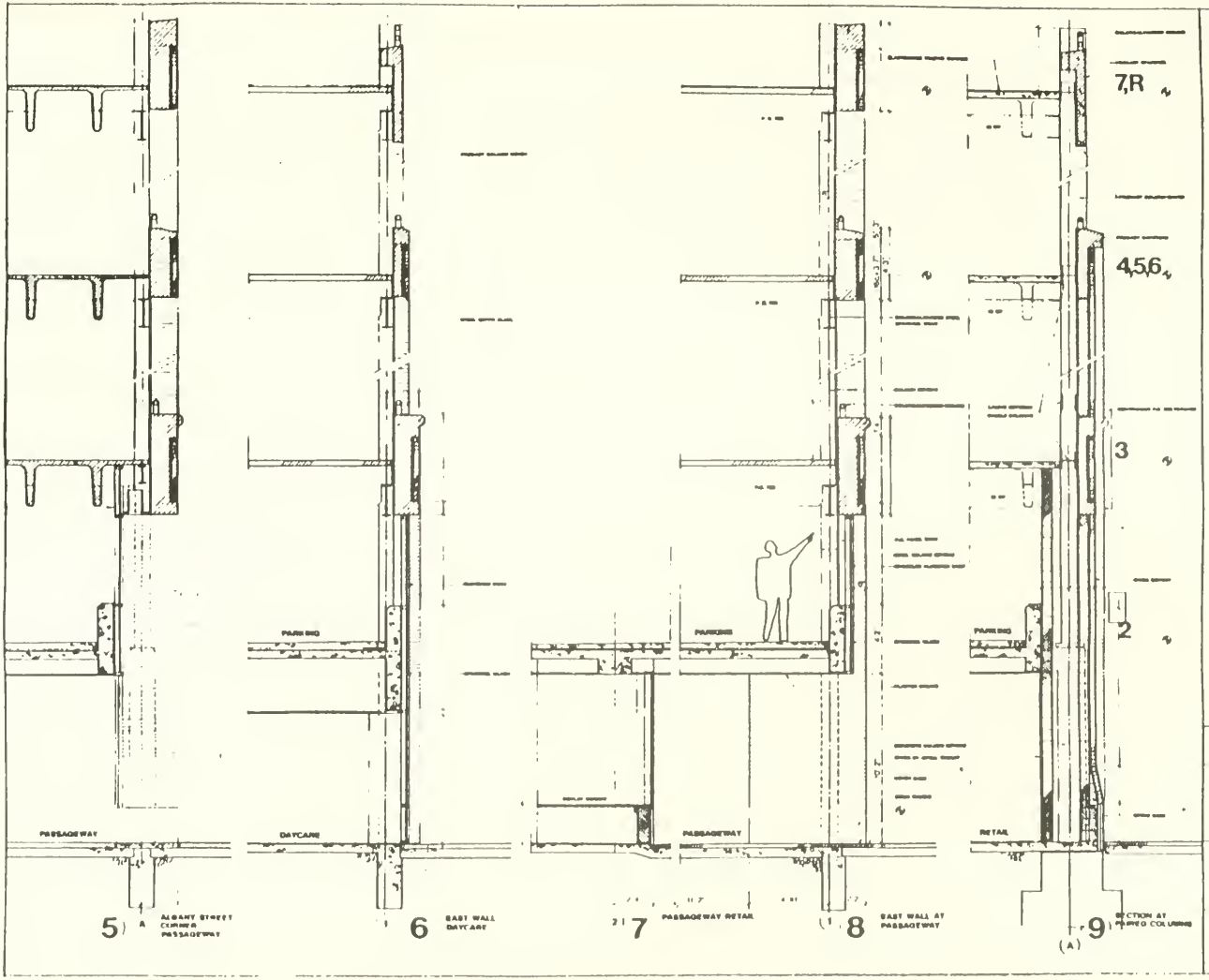


University Associates

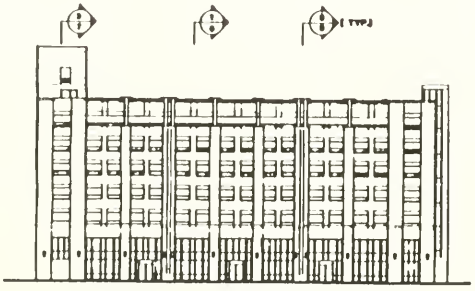
GARAGE
Wall Sections

6

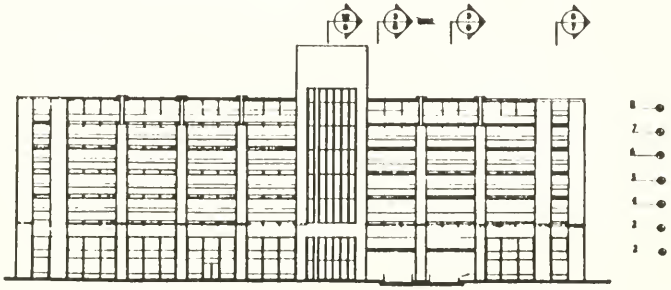


University Associates

GARAGE
Wall Sections



ALBANY STREET ELEVATION



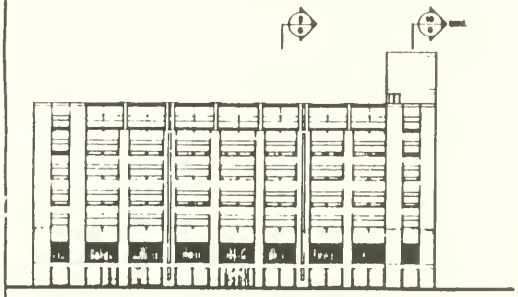
EAST ELEVATION

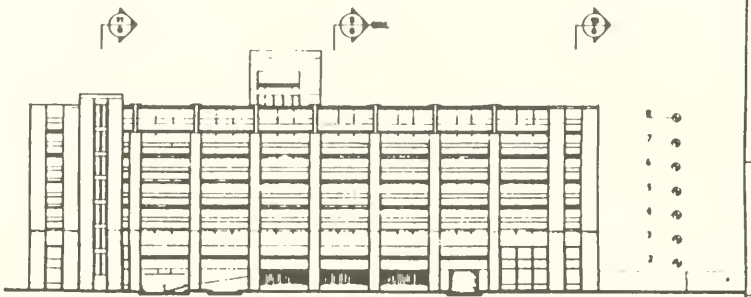
University Associates

GARAGE Elevations

10

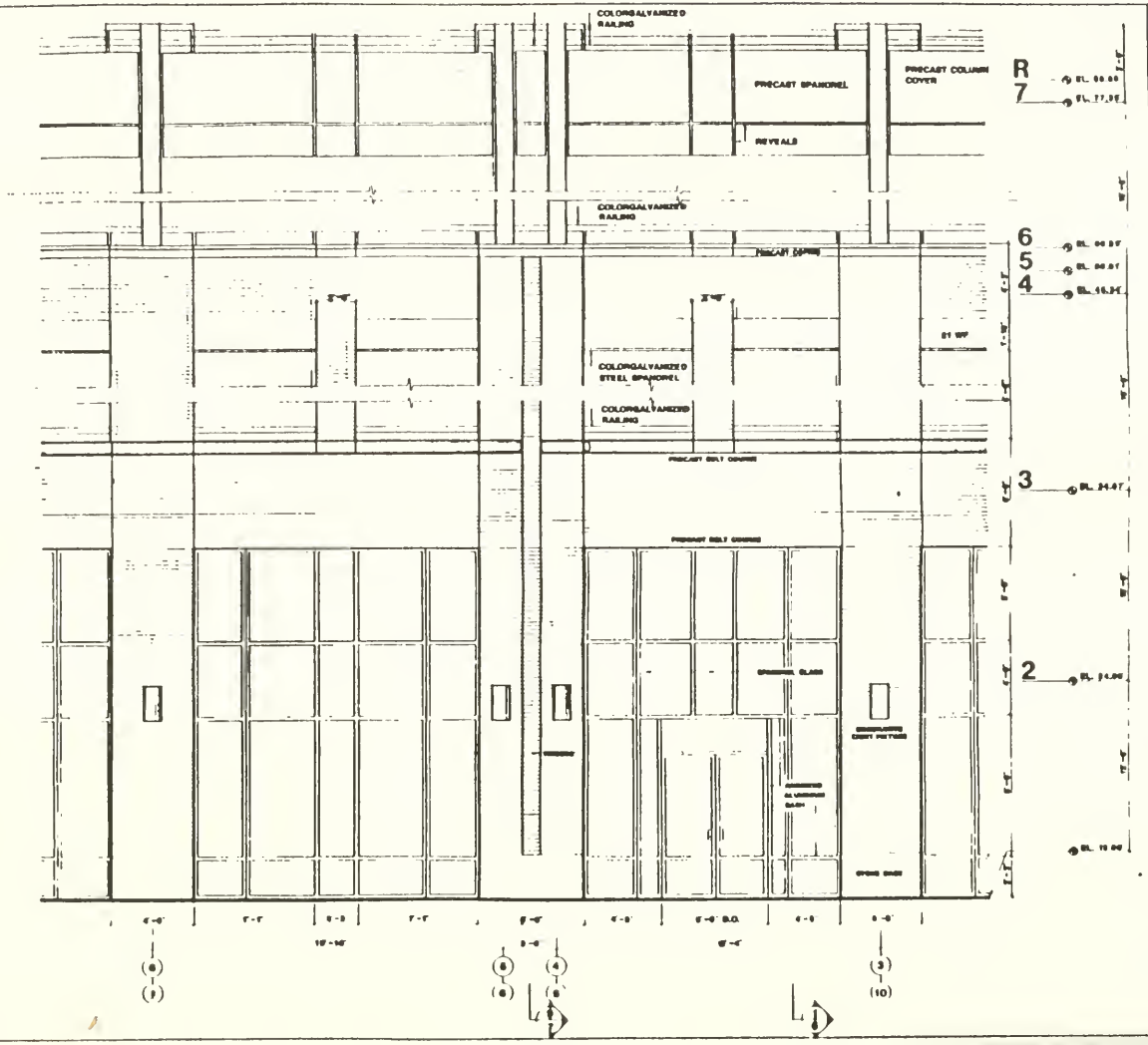
University Associates





GARAGE
Elevations

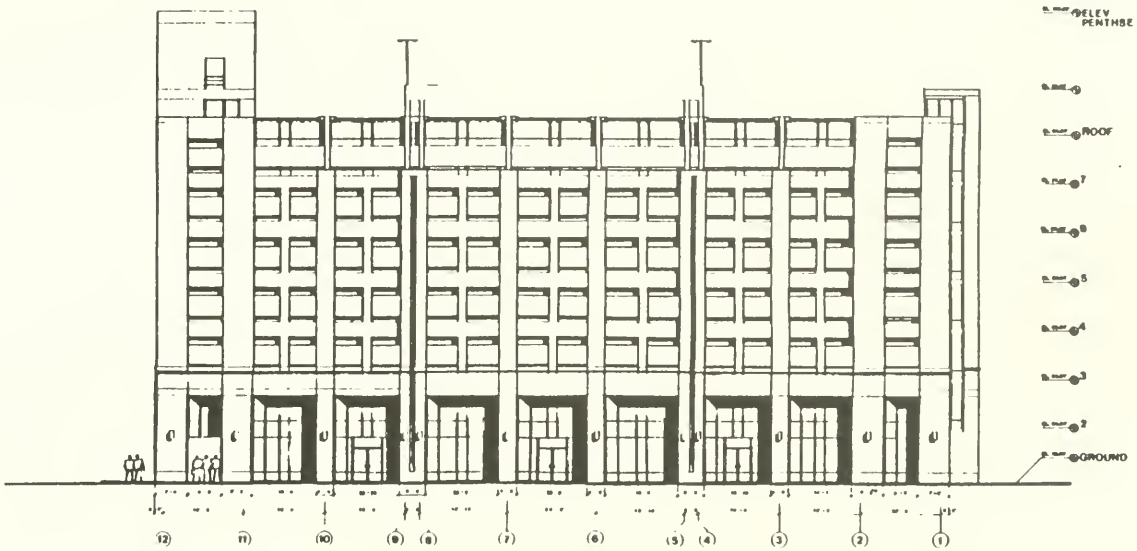
11



University Associates

GARAGE Elevations

12



University Associates

GARAGE
Albany Street Elevation

13

BOSTON REDEVELOPMENT AUTHORITY

DEVELOPMENT PLAN

for

CENTER FOR ADVANCED BIOMEDICAL RESEARCH

within

PLANNED DEVELOPMENT AREA NO. 41

SOUTH END TECHNOLOGY SQUARE

Trustees of Boston Unversity, Developer

September 10, 1991

Development Plan: Simultaneously herewith, the Boston Redevelopment Authority ("BRA") has approved the Master Plan for Planned Development Area No. 41 ("Master Plan PDA") and the Development Impact Project Plan for the Master Plan PDA for South End Technology Square. As referenced in the Master Plan PDA, two or more development plans for projects within the Master Plan PDA would be submitted to the BRA for approval. In accordance with Section 3-1A of the Boston Zoning Code (the "Code"), this development plan sets forth information on the development of the Center for Advanced Biomedical Research ("Project" or "Center"), including the proposed location and appearance of structures, open spaces and landscaping, the proposed uses of the Project, the proposed dimensions of the structure, the proposed density, the proposed traffic circulation, parking and loading facilities, access to public transportation and other major elements of the Project (the "Development Plan"). The Development Impact Project Plan filed with the Master Plan PDA shall satisfy the requirements of Articles 26 and 26B for the Project.

Developer: The developer of the Project is the Trustees of Boston University, a Massachusetts non-profit educational corporation, its successors and assigns (the "Developer"). As contemplated by the Master Plan PDA, the Developer, subject to the BRA'S approval, will succeed to University Associates Limited

Partnership's interests in the Project in order to carry out the Project.

Site: The Project will be constructed on that certain parcel of land shown as Parcel B within PDA No. 41, containing approximately 35,178 square feet of land area and located at 700 Albany Street, Boston, Suffolk County, Massachusetts, as more particularly bounded and described in Exhibit A attached hereto and as shown on the plan entitled "University Associates Development Plan in Boston, Mass (South End District)" dated May 2, 1991, revised August 5, 1991, prepared by Bryant Associates, Inc. and included in Exhibit B to the Master Plan PDA and as shown on the plans entitled: "Development Plan for Center for Advanced Biomedical Research, Planned Development Area No. 41, Boston University, Developer, August, 1991, prepared by Cannon ("Development Plans"), copies of which are attached hereto as Exhibit B, (the "Site" or "Property").

Proposed Location and Appearance of Structure: The Project consists of a structure dedicated for biomedical research containing approximately 180,000 square feet of floor area with a height of 144 feet and a 28 foot penthouse for mechanical systems necessary for the operation of laboratory facilities within the building. This building will be an integral part of the Boston University Medical Center and serve as a scientific research and teaching laboratory. A portion of this building will have street level retail on Albany Street and open onto a pedestrian plaza to be located in the center of the Master Plan PDA site. As set forth in the Master Plan PDA, the entire Master Plan PDA site has the potential for approximately 400,000 to 630,000 square feet of laboratory research use, evidencing the potential of the area to be a major laboratory research area of Boston. The Center for Advanced Biomedical Research would be the catalyst for the expansion of such use and the affiliated uses as described in the Master Plan PDA, and would be in keeping with the City's economic plan for the 1990's which encourages medical and biomedical research as an important element in the stimulation of the city's economy. The establishment of research laboratory use on the site will provide jobs and economic benefits to a wide range of citizens.

The nine story with penthouse structure will be sited on Parcel B which contains approximately 35,178 square feet of land area. The building footprint is approximately 20,000 square feet which allows for a uniform floor size for laboratory use. The building is designed for laboratory research use with a building perimeter of 200 feet by 100 feet. This design allows the creation of laboratory areas of approximately 22 feet in width. The building will be set back approximately 15 feet from Albany Street and such area will be used for sidewalk and planting area. The building will be separated from the proposed 1,000 car garage building on the southwest by a perimeter service or loop road which will allow entrance to the garage as well as entrance to the

building's loading dock. On the east and south sides of the Center open areas will be landscaped as a pedestrian plaza separating the Center from the proposed University Hospital Doctors' office/clinic building ("Medical Arts Building").

The location of the building on Albany Street and its opening to the pedestrian plaza allows for the promotion of retail activities on the first floor. It is currently anticipated that the Center will be located approximately as shown on the Development Plans attached hereto as Exhibit B, although the final location and configuration of the building are subject to final design, environmental and other development review by the Authority and by other governmental agencies and authorities.

The building facade is divided into three horizontal sections: Base, Middle and Top. The Base consists of two stories with the ground level composed of a series of piers and solid corners with infill storefront glazing. The Middle section is separated from the Base and the Top by a series of reliefs and bandings. Vertical expression is emphasized through the proportion of windows, brick relief at column lines, and more solid corner elements. The Top is expressed with special materials, such as metal and stone, and changes in the treatment of windows, louvers, banding and brick reliefs. Distinctive treatment at entries and corners would be used to add definition. The building has been designed in conformity with the requirements of a laboratory research facility, yet sensitive to the form and materials of the surrounding South End and institutional area. Elevations and floor plans for the building are included in the Development Plans attached hereto as Exhibit B. The specific design elements of the building are subject to further design, environmental and other development review by the BRA and other governmental agencies.

Open Spaces and Landscaping: A landscaping and paving plan for the Project includes the sidewalk area on Albany Street and the creation of a portion of the pedestrian plaza which is referenced in the PDA Plans filed with the Master Plan PDA. Landscaping will be noted for its rich vocabulary in pavers, plantings, lighting, signage and other street furniture. The pedestrian plaza will include a combination of grass, large and small trees in a geometric pattern which will be coordinated with the building entrance. The specific area of landscaping for the Project is shown on the Phase I Site Plan included in the Development Plans attached hereto as Exhibit B.

Proposed Uses for the Site and Structure: Present plans contemplate that there will not be a basement area and that the first level will contain service and loading areas usually found in the basement. The first floor, which is accessible from Albany Street and the pedestrian plaza, will also contain retail areas, research areas, mechanical equipment areas and loading docks. Additionally, due to the construction restrictions of the Site and

the lack of basement area, mechanical systems normally located within the basement will be located in the two penthouse levels above the ninth floor. The lobby area of the building will have an open atrium and the second floor will be connected with two bridges crossing the atrium from the north and south sides of the building. It is contemplated that the uses of the second through penthouse levels will be as follows:

Floor	Use
2nd	Dental Laboratories with offices, conference rooms, service and equipment areas.
3rd	Biophysics Laboratories with offices, conference rooms, service and equipment areas.
4th	Biophysics Laboratories with offices, conference rooms, service and equipment areas.
5th	Cardiovascular Institute with offices, conference rooms, service and equipment areas.
6th	Cardiovascular Institute with offices, conference rooms, service and equipment areas.
7th	Animal Science Center with offices, conference rooms, service and equipment areas.
8th	Animal Science Center with offices, conference rooms, service and equipment areas.
9th	Animal Science Center with offices, conference rooms, service and equipment areas.
Penthouse(2)	Equipment, storage and mechanical rooms.
Roof	Cooling towers and exhaust fans.

The proposed zoning uses for the Site and for the structure planned for the Site may include one or more of the following uses:

Use No.	Description	Status	
16A	College or University granting	Conditional	C

	degrees by authority of the Commonwealth of Massachusetts.		
18	Trade, professional or other school.	Conditional	C
24	Scientific research and teaching laboratories not conducted for profit and accessory to Use Item No. 16, 16A, 18, 22, or 23, whether or not on the same lot, provided that all resulting cinders, dust, flashing, fumes, gases, odors, refuse matter, smoke and vapor are effectively confined to the lot or so disposed of as not to be a nuisance or hazard to health or safety; and provided also that no noise or vibration is perceptible without instruments more than fifty feet from the lot or any part of the lot.	Conditional (Allowed	C A)
34	Store primarily serving the local retail business needs of the residents of the neighborhood but not constituting a business as described in Use Item No. 34A, including but not limited to, store retailing one or more of the following: food, baked goods, groceries, packaged alcoholic beverages, drugs, tobacco products, clothing, dry goods, books, flowers, paint, hardware and minor household appliances. (outdoor display)	Conditional (Allowed	C A)
36A	Retail catering	Conditional	C
37	Lunchroom/Restaurant	Allowed	A
39	Office of an accountant, architect, attorney, dentist, physician or other professional person, not accessory to a main use	Allowed	A
40	Real estate, insurance or other agency office	Allowed	A
41	Office building, post office,	Allowed	A

	bank (other than drive-in bank) or other similar establishment		
43	Barber/beauty/shoe shop services establishments	Allowed	A
44	Tailor/Dry Cleaning	Allowed	A
48	Research Laboratory	Allowed	A
61	Car rental agency	Conditional	C
71	Ancillary Uses	Conditional	C
77	Keeping of Laboratory Animals	Conditional	C
80	Storage of Flammable Liquid and Gases Incidental to a lawful use	Allowed	A
85	Accessory Use which is ancillary to and ordinarily incident to a lawful main use	Allowed	A

or any other allowed use for a B-4 district.

Proposed Dimensions of Structure: The Center will be located on Parcel B of the Site containing approximately 35,178 square feet of site area. The building will have a footprint of 20,000 square feet and will be set back from Albany Street approximately 15 feet. The side yard set back from the service road for the Site will be approximately 10 feet. The main open areas on the Site will be the areas between the Center and the Medical Arts Building on the north and the pedestrian plaza to the rear of the structure. The building measurements will be approximately 200 feet by 100 feet which allows for the placement of research laboratory bays with a dimension of 22 feet by 34 feet. The building will have a height of 144 feet for nine levels plus an additional (28 ft.) two level penthouse which will contain mechanical equipment for the operation of the building. The gross floor area of the building will be approximately 180,000 square feet which is calculated based upon nine levels of usable space, each level containing approximately 20,000 square feet. For purposes of determining gross floor area in accordance with the Code, mechanical and electrical space on the penthouse floors was not included. Based upon the gross floor area and the lot size of 35,178 square feet, the floor area ratio equals 5.1. This requires an Exception from the provisions of the Code. Upon establishment of the Master Plan PDA, the Site will be located in a B-4-D zoning district, modified from the former H-3 district, a residential district with a maximum floor area ratio ("FAR") of 3.0. In such districts, relief from the requirements of the Code

may be sought as Exceptions pursuant to Article 6A of the Code. Because the design of the Project is subject to further design, environmental and other development review by the Authority and other governmental agencies and authorities, the zoning relief required for the Project may change due to such review.

Proposed Density and Zoning: This Development Plan provides for an overall FAR for the Site of 5.1 based upon the ratio of 180,000 square feet of gross floor area of Project to the total Site area of approximately 35,178 square feet. However, the actual FAR calculated in accordance with the technical definitions of "gross floor area," "floor area ratio" and "lot area" in the Code may be greater than 5.1. For example, roadways, sidewalks, pathways and other paved areas forming the pedestrian plaza may be excluded from the definition of "lot area" in the Code. Accordingly, the "lot area" used to calculate FAR in accordance with the Code may not include the entire area of the Site. As referenced in the Master PDA, the entire Site will be subdivided into various development parcels for sale or lease to users and developers of the various parcels. Therefore, it will be necessary to insure that the proposed density for Parcel B is not affected by changes in the densities of other parcels and building plans within the Master Plan PDA. Although the total proposed density of the Project Site is 5.1 and the total proposed density of the Master Plan PDA site is 3.2, these ratios may change due to design and development review by the authority and other governmental agencies and authorities.

Due to the location and size of the Center and the need to establish separate development parcel for the development and financing of the Center, it is contemplated that certain provisions of the Code will not be met by the Project design. Therefore, pursuant to Article 6A of the Code, Exceptions may be granted by the Board of Appeal for projects located within planned development areas and urban renewal subdistricts. It is contemplated that, based upon the present development plans for the Center, the following Exceptions are needed from the provisions of the Code:

1. Conditional Use Permits or Exceptions Required for Article 8, Section 8-7, Uses;

Use Number	Use	Status	
16A	College or University granting degrees by authority of the Commonwealth of Massachusetts.	Conditional	C
18	Trade, professional or other school.	Conditional	C
24	Scientific research and teaching laboratories	Conditional (Allowed	C A)

	not conducted for profit and accessory to Use Item No. 16, 16A, 18, 22, or 23, whether or not on the same lot, provided that all resulting cinders, dust, flashing, fumes, gases, odors, refuse matter, smoke and vapor are effectively confined to the lot or so disposed of as not to be a nuisance or hazard to health or safety; and provided also that no noise or vibration is perceptible without instruments more than fifty feet from the lot or any part of the lot.		
34	Store primarily serving the local retail business needs of the residents of the neighborhood but not constituting a business as described in Use Item No. 34A, including but not limited to, store retailing one or more of the following: food, baked goods, groceries, packaged alcoholic beverages, drugs, tobacco products, clothing, dry goods, books, flowers, paint, hardware and minor household appliances. (outdoor display)	Conditional (Allowed	C A)
36A	Retail catering	Conditional	C
61	Car rental agency	Conditional	C
71	Ancillary Uses	Conditional	C
77	Keeping of Laboratory Animals	Conditional	C

2. Exceptions Required for Dimensional Requirements.

Article 2, Section 2-1	Area and Lot Definitions
Article 15, Section 15-1	Floor Area Ratio
Article 19, Section 19-1	Minimum Side Yard
Article 20, Section 20-1	Minimum Rear Yard
Article 21, Section 21-1	Minimum Setback Requirements
Article 24, Section 24-1	Off-Street Loading Requirements

Projected Number of Employees: It is anticipated that the Project will generate approximately 500 construction jobs. With respect to permanent jobs, based upon the current development scheme, approximately 400 jobs will be created.

Proposed Traffic Circulation: The present use of the Site as a parking lot generates traffic from Albany Street and Massachusetts Avenue to two main parking lots within the Site. With the development of the Center, traffic circulation will be limited to a perimeter service or loop road connected to Albany Street. Vehicular traffic access to the Center is thus limited to Albany Street and the perimeter service road. Parking for such vehicles will be available in the parking garage to be constructed on Parcel A. Additionally, it is expected that on-street parking will remain available on Albany Street. Delivery and loading facilities are located on the service road side of the building and are accessible from such road.

Parking and Loading Requirements: The Center will not contain parking areas either at grade or below grade for the occupants and users of the Center. It is contemplated that the parking requirements of the Center will be satisfied with the construction of the 1,000 car parking garage adjacent to the Center on Parcel A. A parking access plan will be developed by a garage management organization to ensure the availability of parking for project users. Parking is accessible from the perimeter service road and upon completion of an extension of East Concord Street from such extension. The Center plans contemplate the construction of two off-street loading bays which will be located completely within the building and accessible from the perimeter service road. These loading areas are shown on the Development Plans attached hereto as Exhibit B. The loading platform will be of sufficient depth and width to allow for their use by delivery vehicles.

Access to Public Transportation: With the relocation of the Orange Line to the Southwest Corridor, the availability of rapid transit service to the Site has been reduced, although the MBTA has instituted bus service along Albany Street. The developer intends to coordinate with the MBTA the promotion of public transportation together with carpools, vanpools and the caravan system. The Project will be subject to a Transportation Access Plan Agreement which will outline specific strategies such as roadway and traffic control improvements, traffic demand management, public transportation, parking management, loading, pedestrian improvements and construction traffic management. The Project will also be subject to an Inter-institutional Transportation Management Association Agreement ("ITMA") which would have as its specific objective: the implementation of measures that minimize automobile use to and from the area. The ITMA will seek to accomplish this objective by: promoting the concept of ride sharing through project marketing efforts, implementing a computerized ride share program, establishing a public awareness program on transportation options, establishing a preferential parking program for carpools and vanpools, sponsoring a semi-annual transportation awareness day, promoting bicycle transportation and encouraging employers to implement alternative work schedules and to promote increase usage of public

transportation services.

Public Benefits: The Project as part of the Master PDA will provide substantial public benefits to the City of Boston and the surrounding neighborhood. Not only will the Project provide direct benefits due to the development, construction and occupancy of the Project, but also the Project will insure continuation and strengthening of existing public benefits to the City and the neighborhood from the operation of the Boston University Medical Center (the "Medical Center"). This Project is unique in the extent of public benefits in that it will ensure the continuation, strengthening and expansion of existing medical research institutions in the area. This Project will generate both direct and indirect economic benefits and directly affect the economic issues of jobs, health care, and education, which are of great importance to the City in the 1990's and the next century. These benefits are wide ranging and comprehensive and are directed to City of Boston residents, school children, and those in need of medical care. The additional benefits resulting from the Project will include a unique educational and occupational opportunity for graduates of Boston high schools in biomedical research programs and the clinical sciences of Boston University School of Medicine. The opportunity provides an opening for City of Boston residents and their children to make a contribution to the advancement of medical research in the City and to strengthen the economic fabric of the South End and the medical and institutional community.

In addition to these long-term and substantial benefits from the Project and its sponsors, the Project, as part of the Master Plan PDA, will participate in the Inter-institutional Transportation Management Association with the Medical Center and Boston City Hospital, will contribute to the maintenance program for Franklin Square, Blackstone Square and Worcester Square parks in conjunction with the Boston Parks Department, and will contribute to Housing Linkage based upon the contribution formula of $5.00 per square foot of floor area in excess of 100,000 square feet, exclusive of garage space, and Jobs Linkage based upon the contribution formula of $1.00 per square foot of floor area in excess of 100,000 square feet, exclusive of garage space. The Project will also provide public benefits in construction jobs, taxes, PILOT contributions and indirect economic benefits for the neighborhood and the City of Boston.

In summation, the Project as part of the Master Plan PDA and the DIP Plan and DIP Agreement will provide for the continuation and enhancement of numerous public benefits through the continuation of the medical research and institutional uses in the South End and the strengthening of such uses.

Development Review Procedures: All design plans for the Project are subject to on-going development review and approval of the BRA. Such review is to be conducted in accordance with Article 31 of the Code and the BRA Development Review Procedure,

dated 1985, revised 1986, in the form attached to the Cooperation Agreement for the Site, as defined and modified by such Cooperation Agreement.

LIST OF EXHIBITS
to
DEVELOPMENT PLAN
for
CENTER FOR ADVANCED BIOMEDICAL RESEARCH

Exhibit A	Site Description
Exhibit B	Development Plan for Center for Advanced Biomedical Research, Boston University, Developer, August 1991, prepared by Cannon

EXHIBIT A

PDA SITE DESCRIPTION

PARCEL "B"

A certain parcel of land in Boston, Suffolk County, Massachusetts, shown as Parcel "B" on a plan entitled "University Associates Development Plan in Boston, Mass. (South End District)," prepared by Bryant Associates, Inc., dated May 2, 1991, revised August 5, 1991, scale 1" = 40', to be recorded with the Boston Redevelopment Authority for the Master Plan and Development Project Impact Plan for Planned Development Area No. 41 pursuant to Article 3, Section 3-1A of the Boston Zoning Code, and bounded and described according to said plan as follows:

Beginning at a point on the southeasterly side of Albany Street at the northwesterly corner of said Parcel "B" as shown on said plan, and thence running

NORTH 45° 56' 20" EAST by Albany Street for a distance of two hundred sixty-nine and 19/100 (269.19) feet; thence turning and running

NORTH 44° 03' 40" WEST for a distance of one hundred thirty and 68/100 (130.68) feet; thence turning and running

SOUTH 45° 56' 20" WEST for a distance of two hundred sixty-nine and 19/100 (269.19) feet; thence turning and running

SOUTH 44° 03' 40" EAST for a distance of one hundred thirty and 68/100 (130.68) feet to the point of beginning;

Containing 35,178 square feet of land (more or less), according to said plan.

BOSTON UNIVERSITY

Development Plan for the Center for Advanced Biomedical Research

Planned Development Area #____

Developer — Boston University
147 Bay State Road
Boston, MA 02215

Architect — Cannon
148 State Street
Boston, MA 02109
(617) 742-6440

Structural Engineer — Cannon
2170 Whitehaven Road
Grand Island, NY 14072
(716) 773-6800

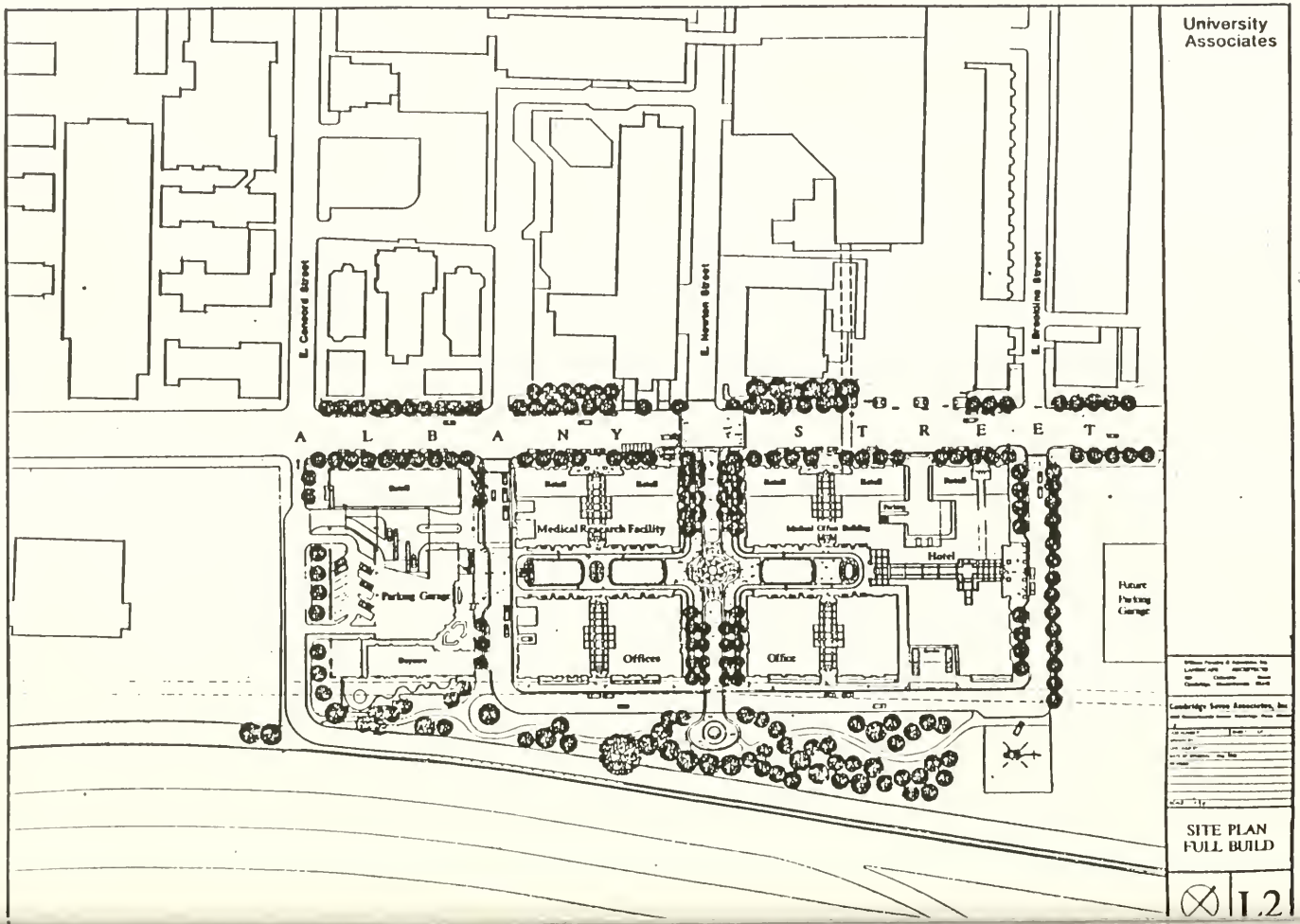
Mechanical/ Electrical Engineer — Cosentini Associates
44 Brattle Street
Cambridge, MA 02138
(617) 876-3830

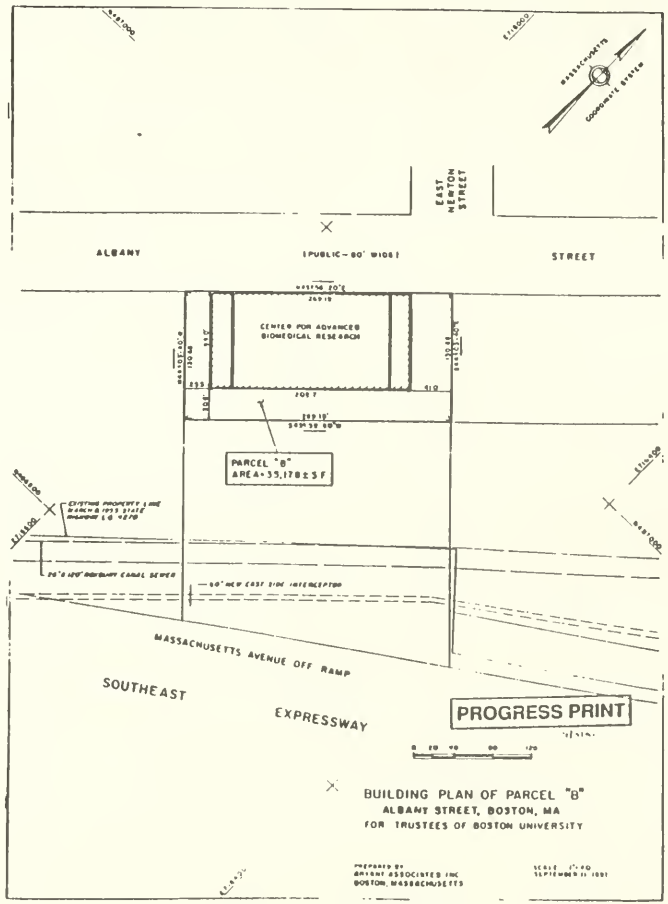
Laboratory Consultant — Earl Walls Associates
5348 Carroll Canyon Road
San Diego, CA 92121
(619) 457-2400

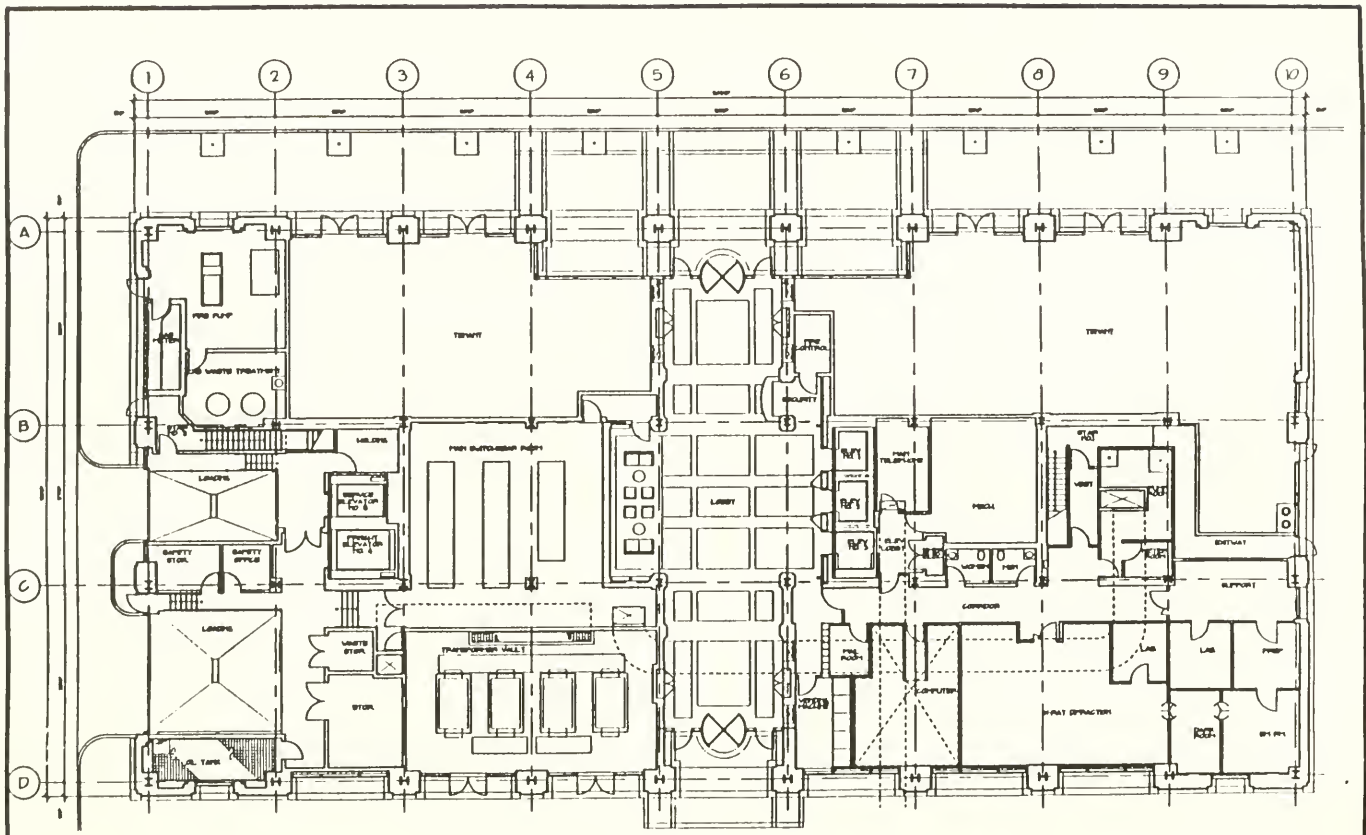
AUGUST 1991

List of Drawings

Master Plan
Site Plan
Ground Floor Plan
Second Floor Plan
Third Floor Plan
Fourth Floor Plan
Fifth Floor Plan
Sixth Floor Plan
Seventh Floor Plan
Eighth Floor Plan
Ninth Floor Plan
Penthouse Floor Plan
Equipment Platform Plan
Roof Plan
North Elevation
East and West Elevations
South Elevation
Building Section


University Associates
E. Concord Street
E. Newton Street
E. Brookline Street
A L B A N Y S T R E E T
Medical Research Facility
Medical Office Building
Hotel
Parking Garage
Offices
Office
Future Parking Garage
Cambridge Seven Associates, Inc.
SITE PLAN
FULL BUILD
L2


EAST NEWTON STREET
ALBANY
(PUBLIC – 80' WIDE)
STREET
CENTER FOR ADVANCED BIOMEDICAL RESEARCH
PARCEL "B"
AREA = 35,178 ± SF
MASSACHUSETTS AVENUE OFF RAMP
SOUTHEAST
EXPRESSWAY
PROGRESS PRINT
BUILDING PLAN OF PARCEL "B"
ALBANY STREET, BOSTON, MA
FOR TRUSTEES OF BOSTON UNIVERSITY

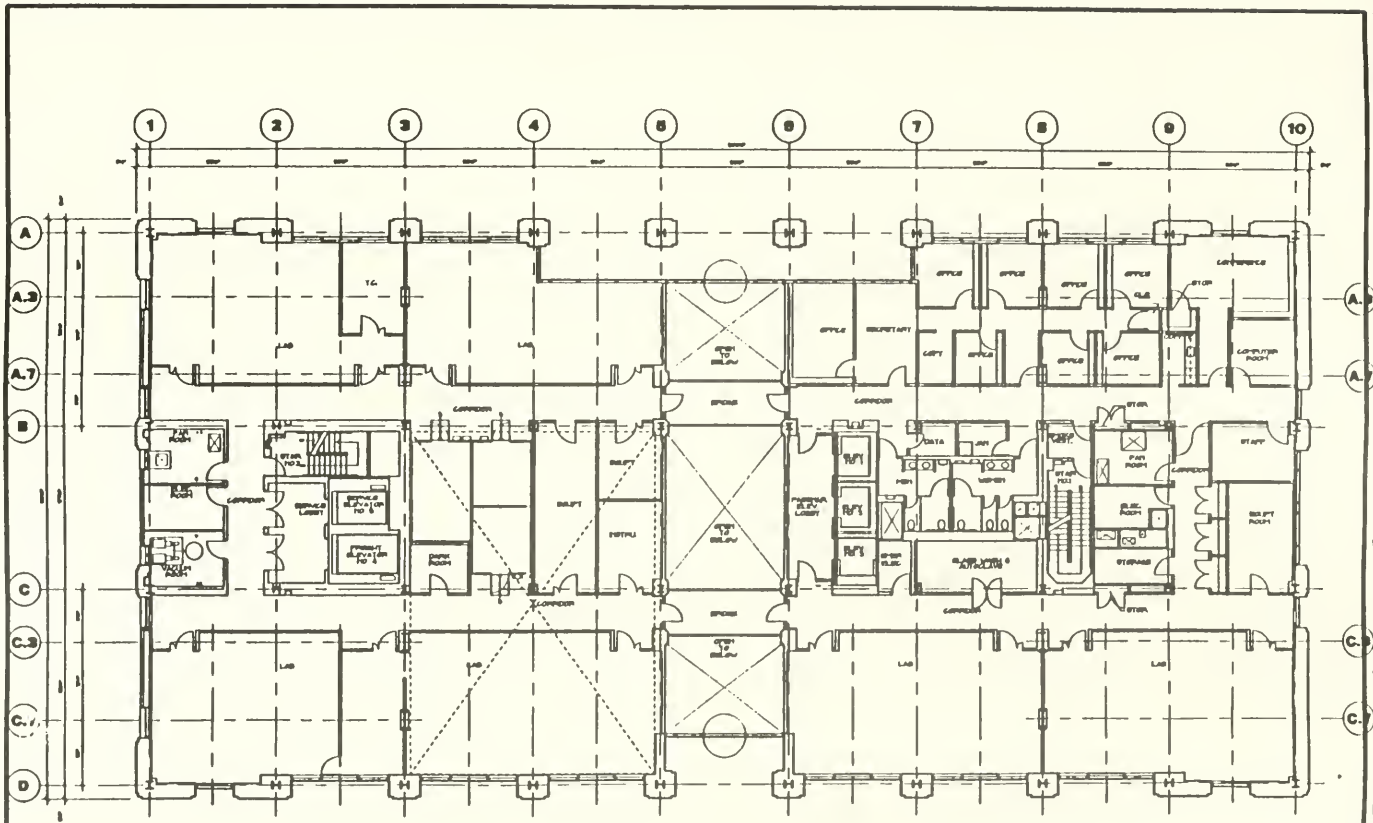


GROUND FLOOR PLAN

0 8 16 24 FT

Boston University
Center for Advanced
Biomedical Research

PROGRESS PRINT
NOT FOR CONSTRUCTION

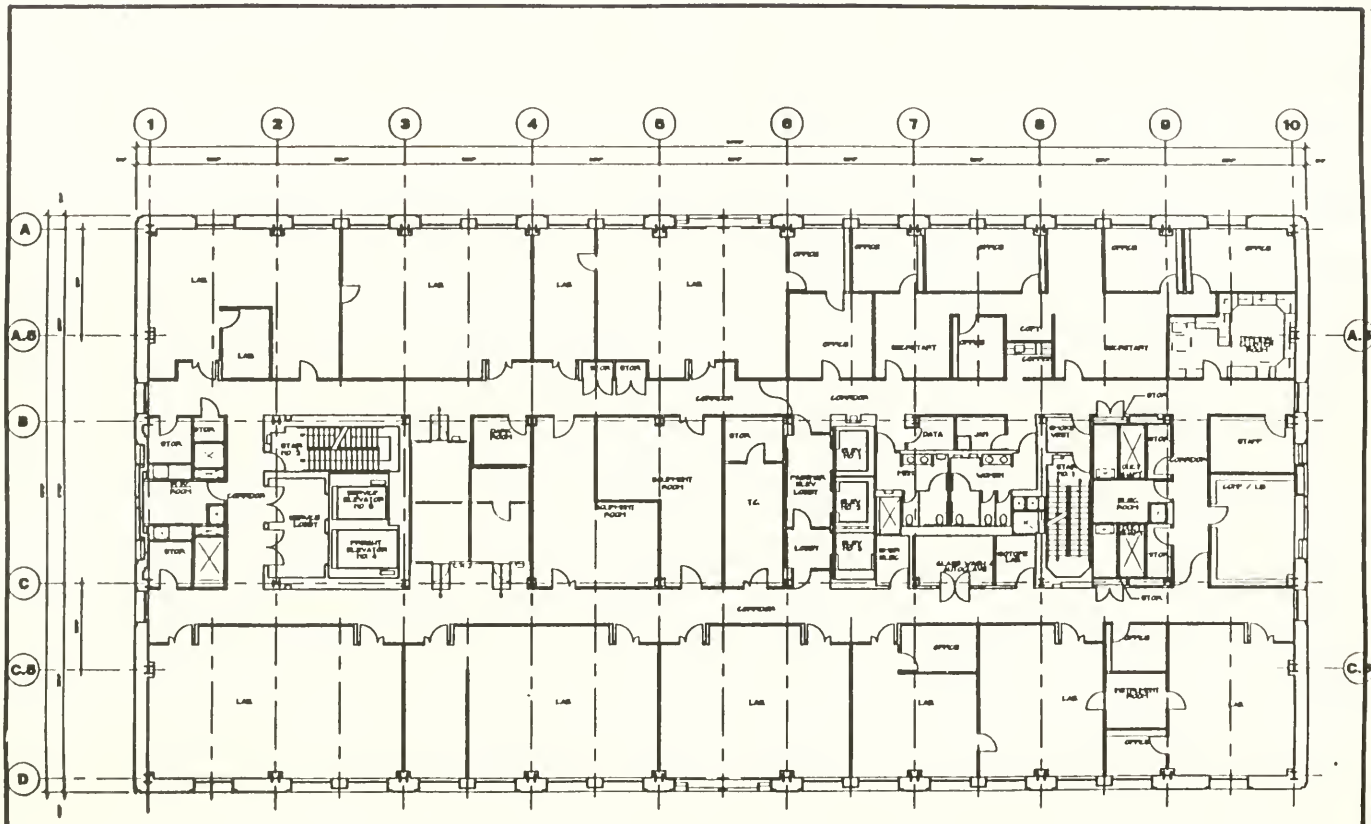


SECOND FLOOR PLAN

0 5 10 20 FT.

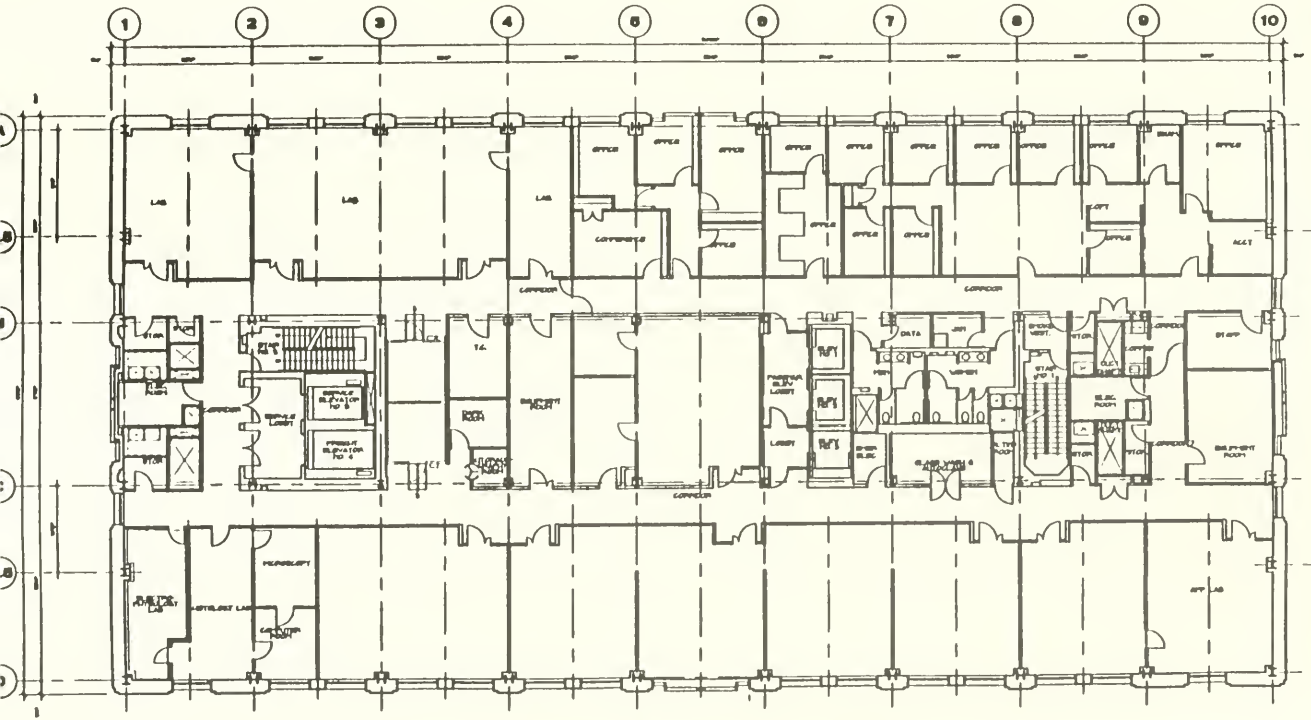
Boston University
Center for Advanced
Biomedical Research

PROGRESS PRINT
NOT FOR CONSTRUCTION



THIRD FLOOR PLAN

0 8 16 32 FT

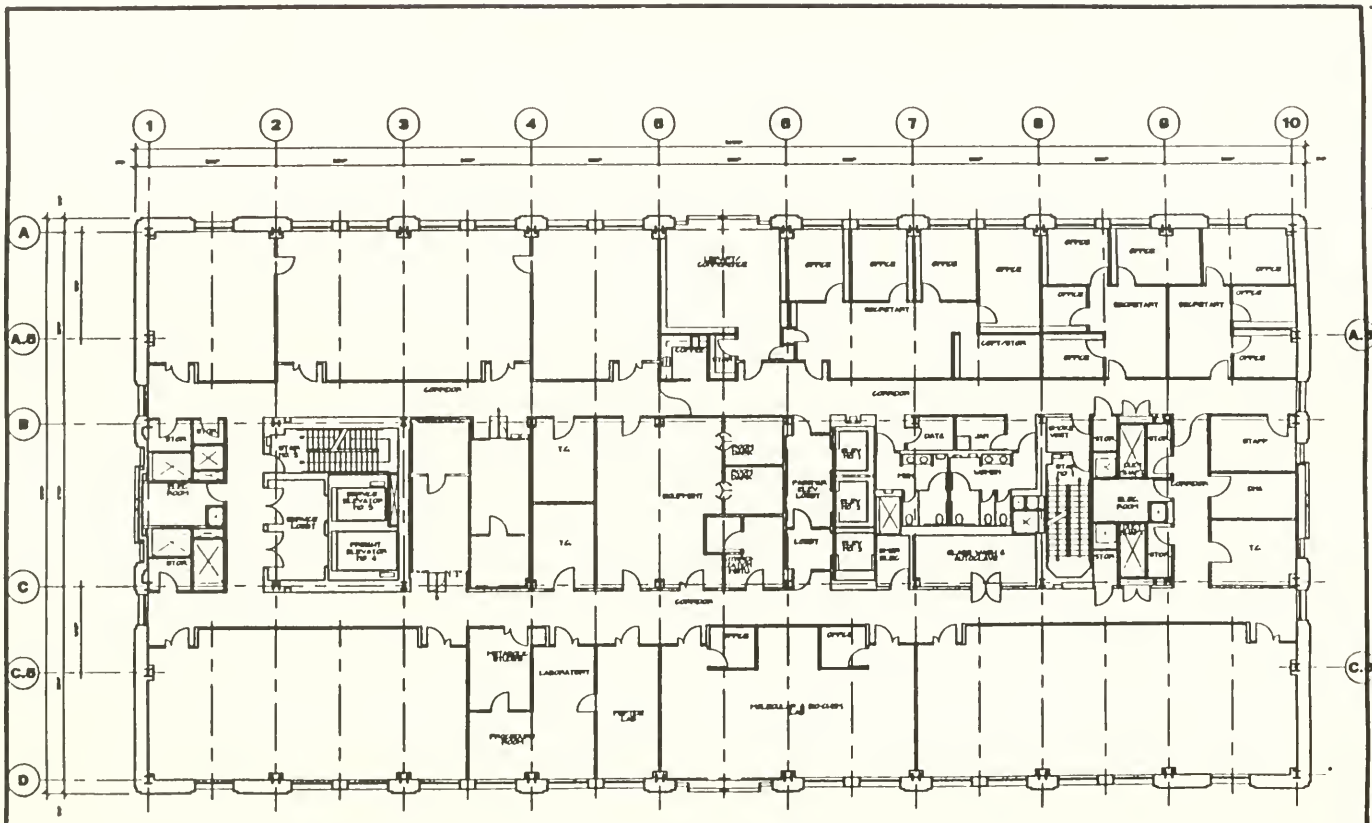


FOURTH FLOOR PLAN

0 5 10 20 FT

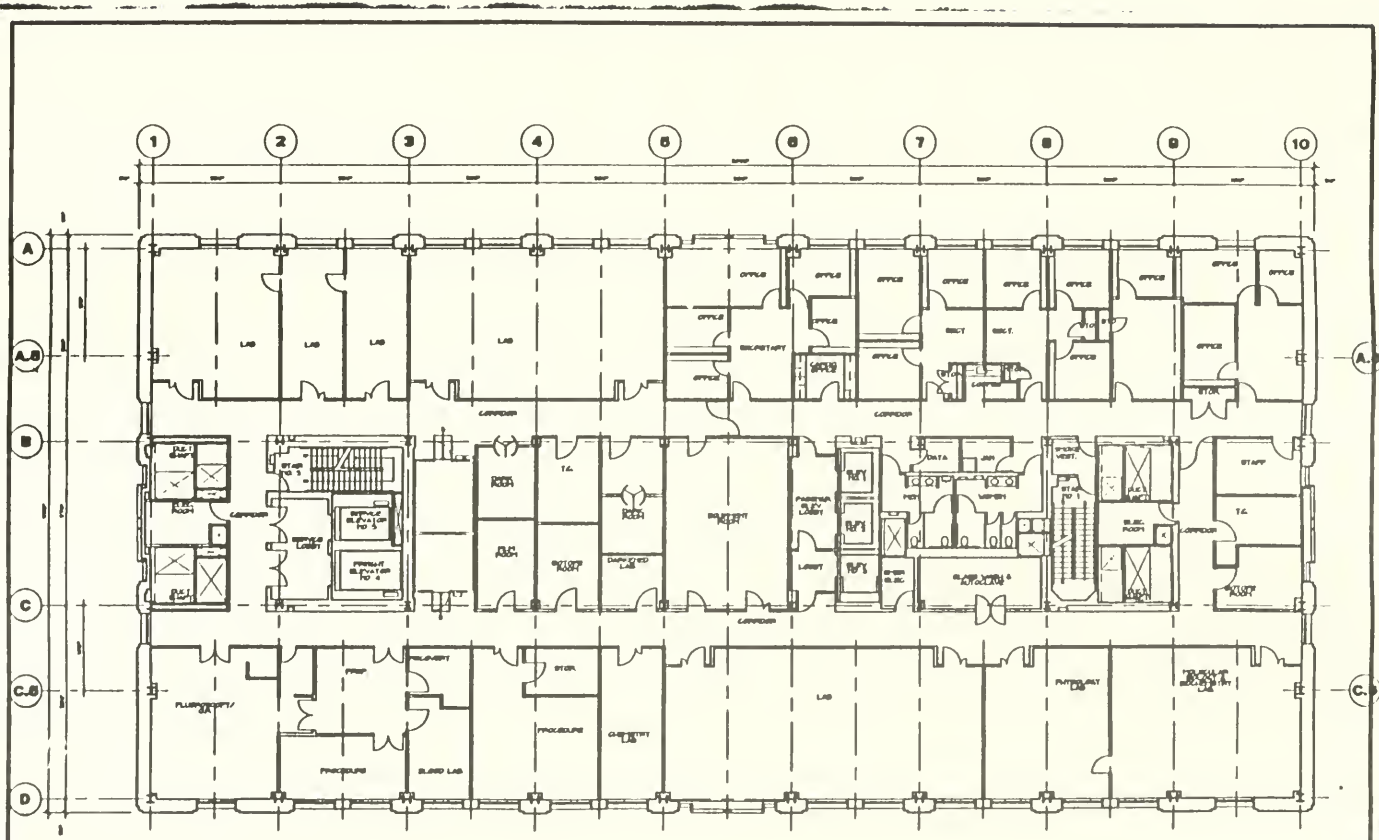
Boston University
Center for Advanced
Biomedical Research

PROGRESS PRINT
NOT FOR CONSTRUCTION



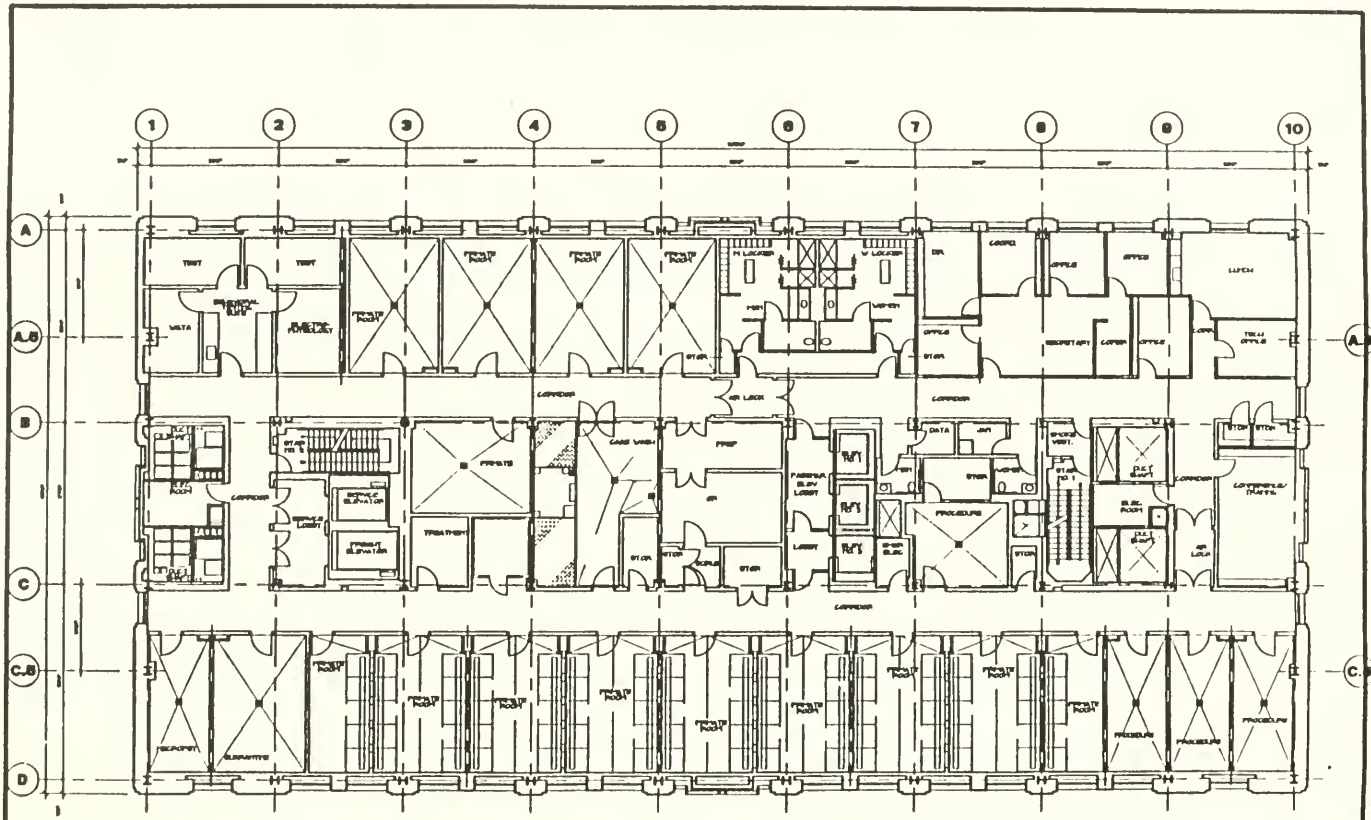
FIFTH FLOOR PLAN

0 5 10 20 FT



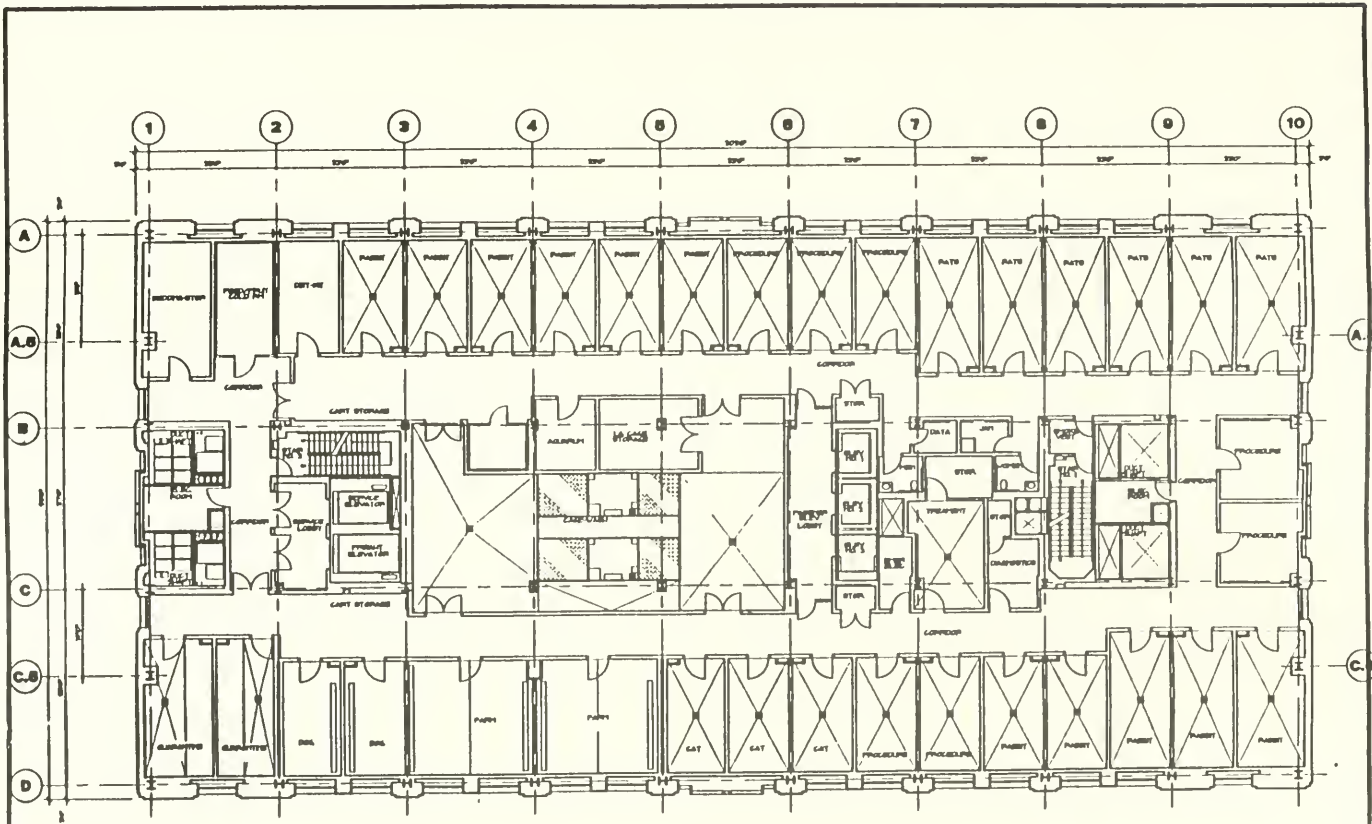
SIXTH FLOOR PLAN

0 8 16 32 FT



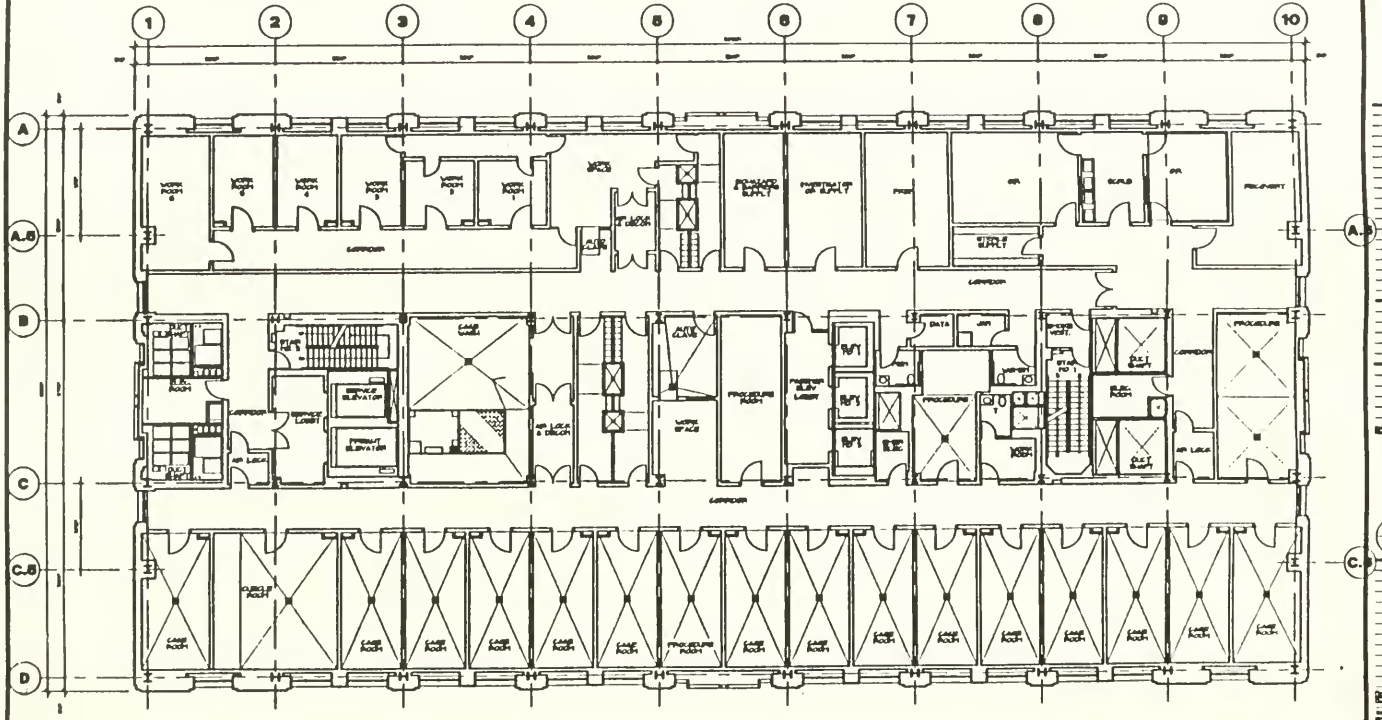
SEVENTH FLOOR PLAN

0 5 10 20 FT.



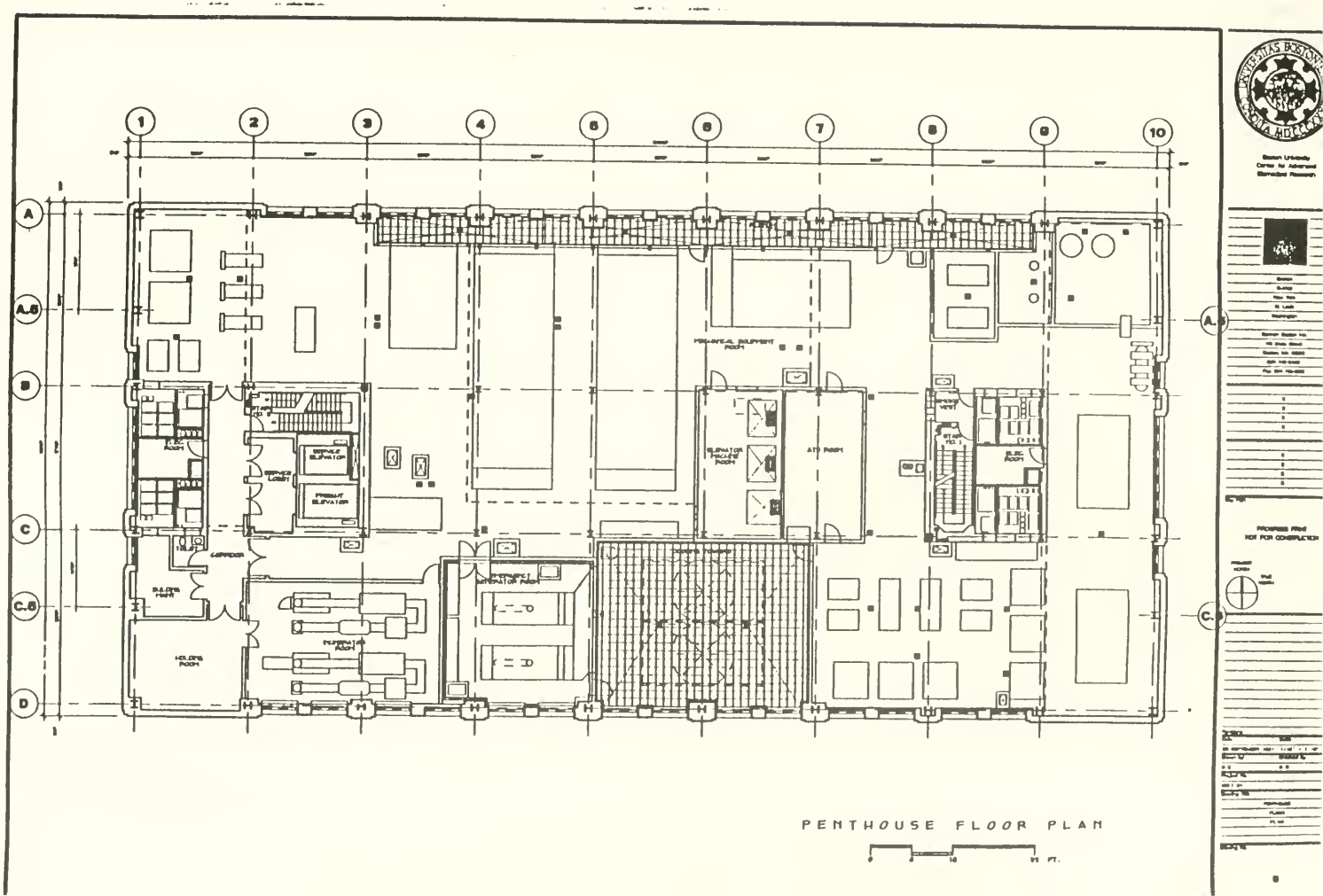
EIGHTH FLOOR PLAN

0 5 10 20 FT.

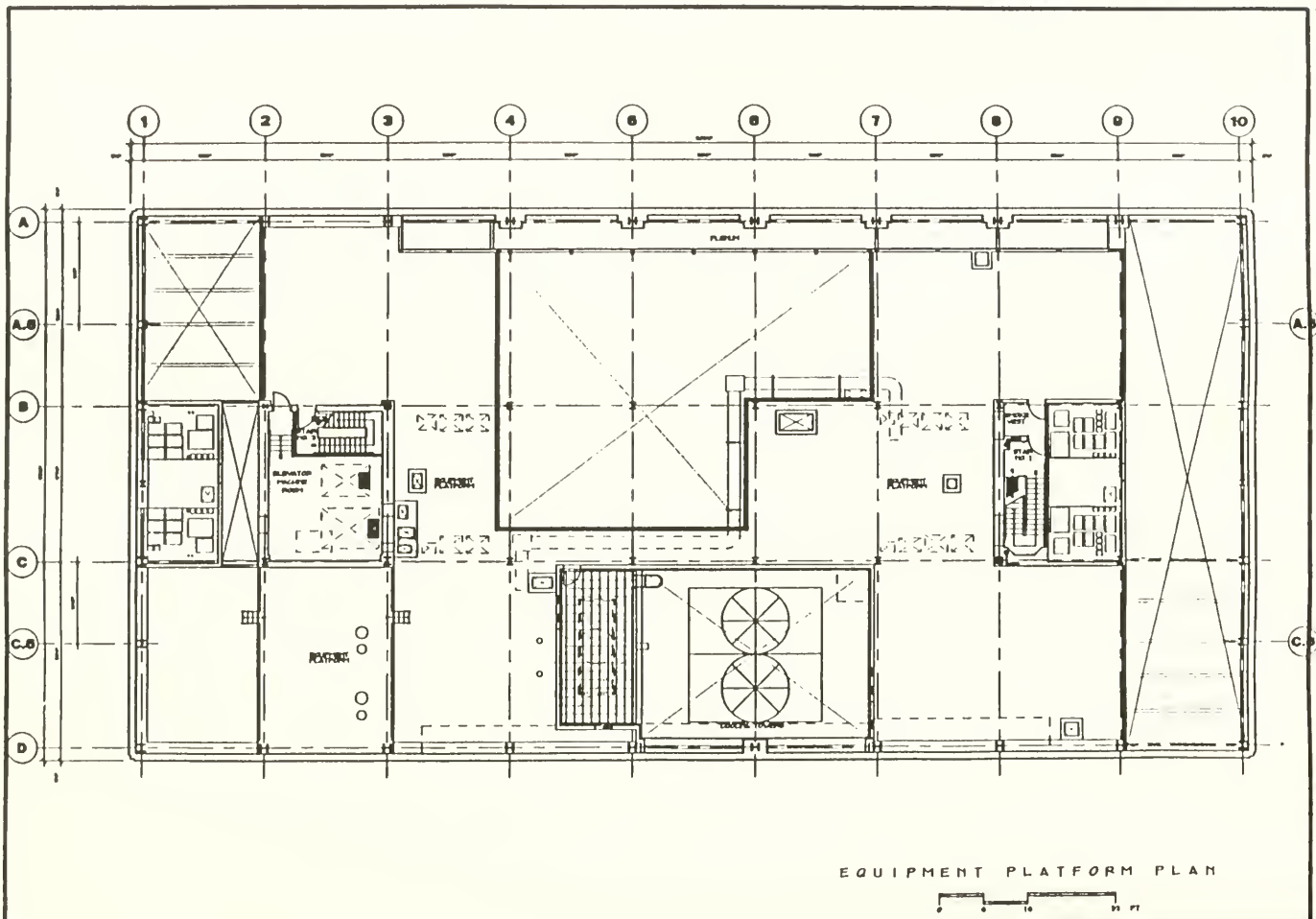


NINTH FLOOR PLAN

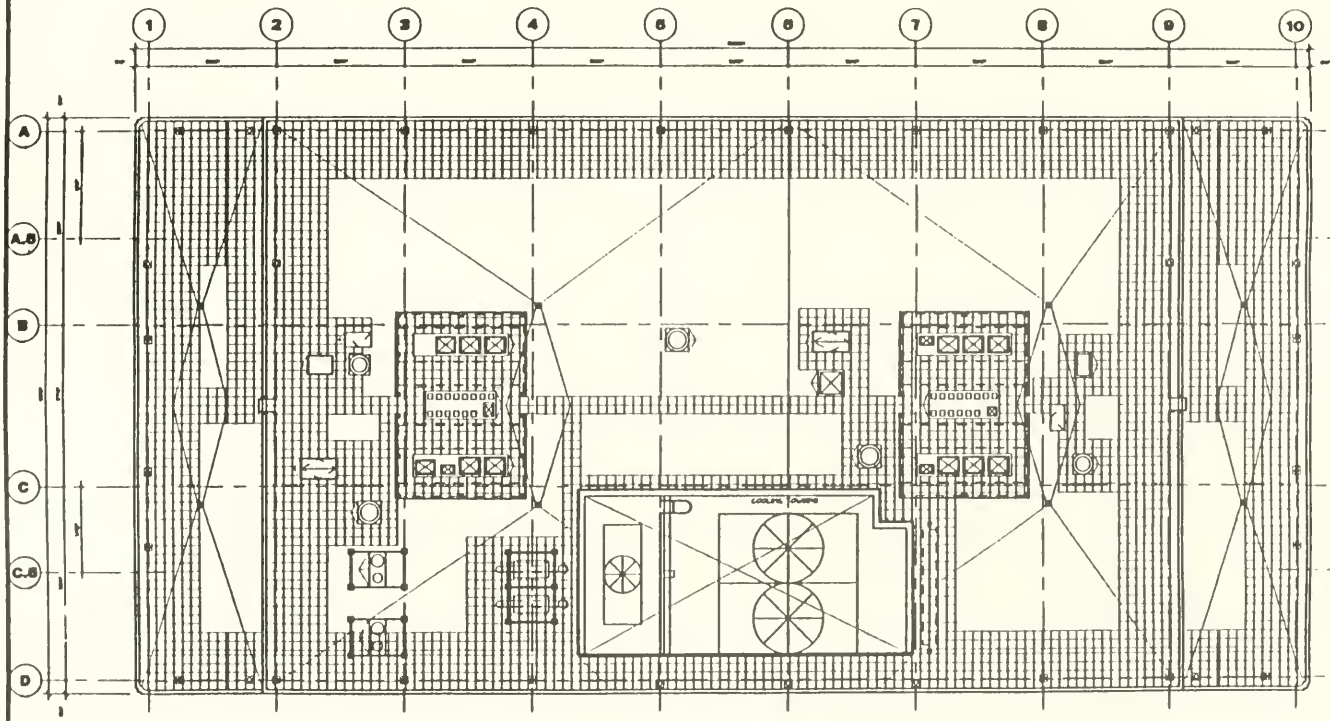
0 5 10 20 FT



1
2
3
4
5
6
7
8
9
10
A
A.5
B
C
C.5
D
MECHANICAL EQUIPMENT ROOM
ELEVATOR MACHINE ROOM
ATP ROOM
SERVICE ELEVATOR
FREIGHT ELEVATOR
SERVICE LOBBY
CORRIDOR
BUILDING MAINT
HOLDING ROOM
INCINERATOR ROOM
PROGRESS PRINT
NOT FOR CONSTRUCTION
PENTHOUSE FLOOR PLAN



EQUIPMENT PLATFORM PLAN



ROOF PLAN

0 5 10 20 FT

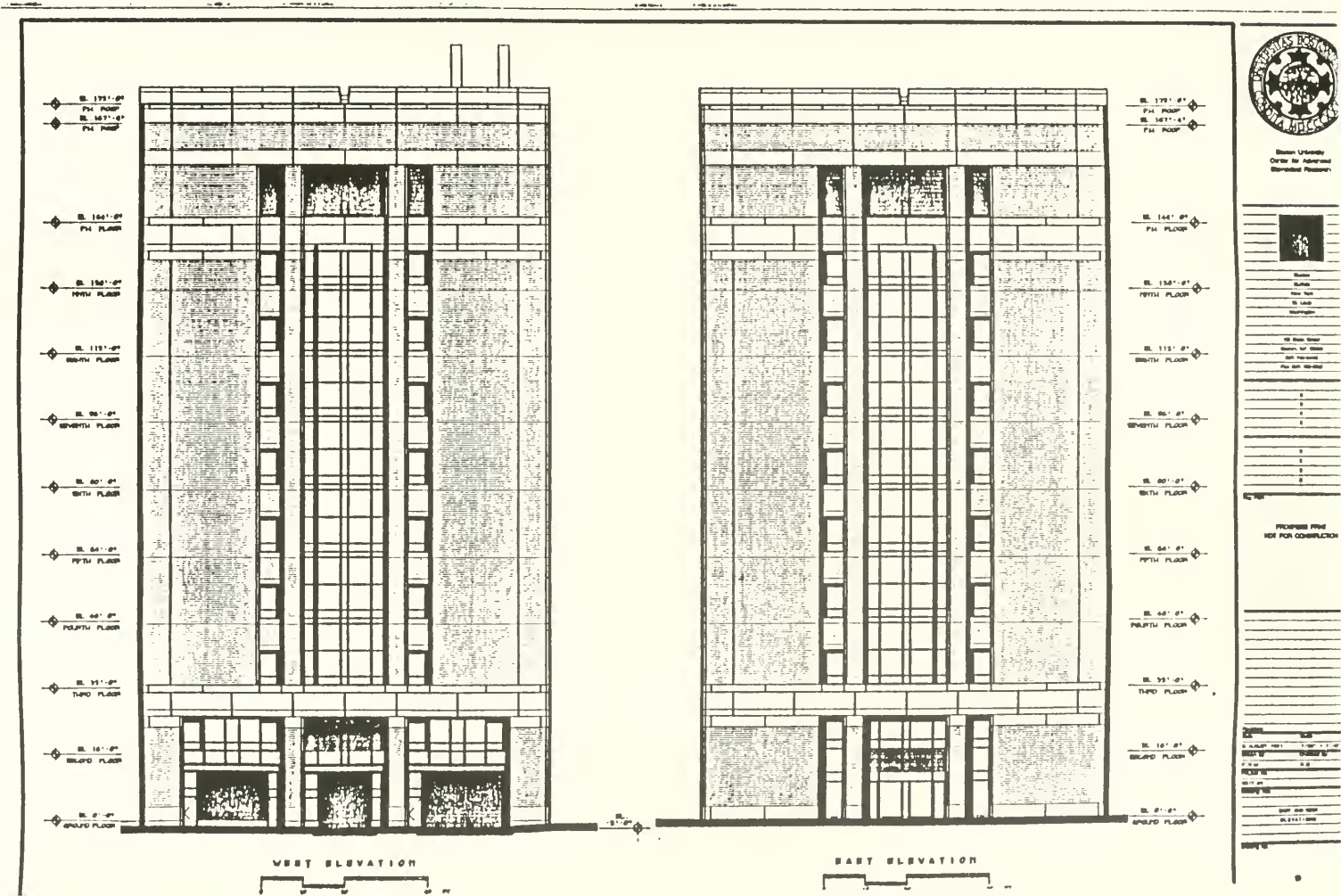
Boston University
Center for Advanced
Biomedical Research

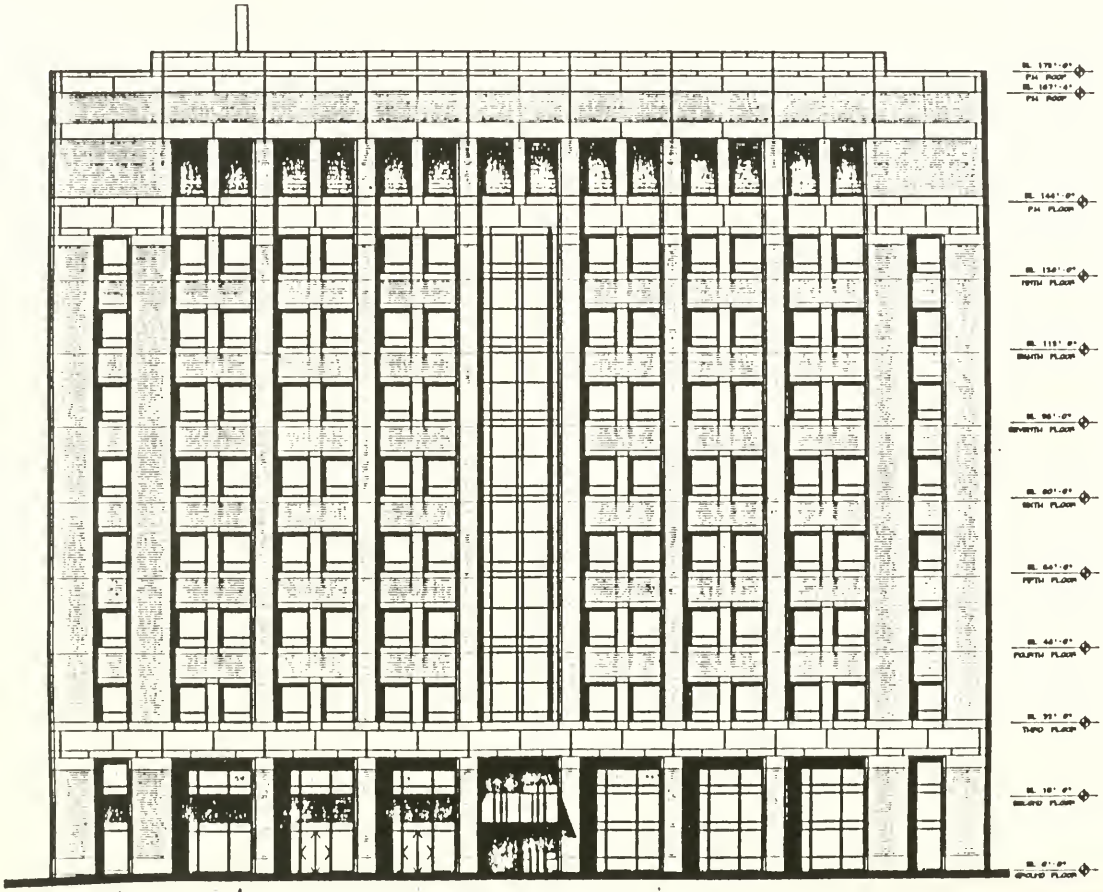
PROGRESS PRINT
NOT FOR CONSTRUCTION

NORTH ELEVATION · ALBANT STREET

Boston University
Center for Advanced
Biomedical Research

PROGRESS PRINT
NOT FOR CONSTRUCTION

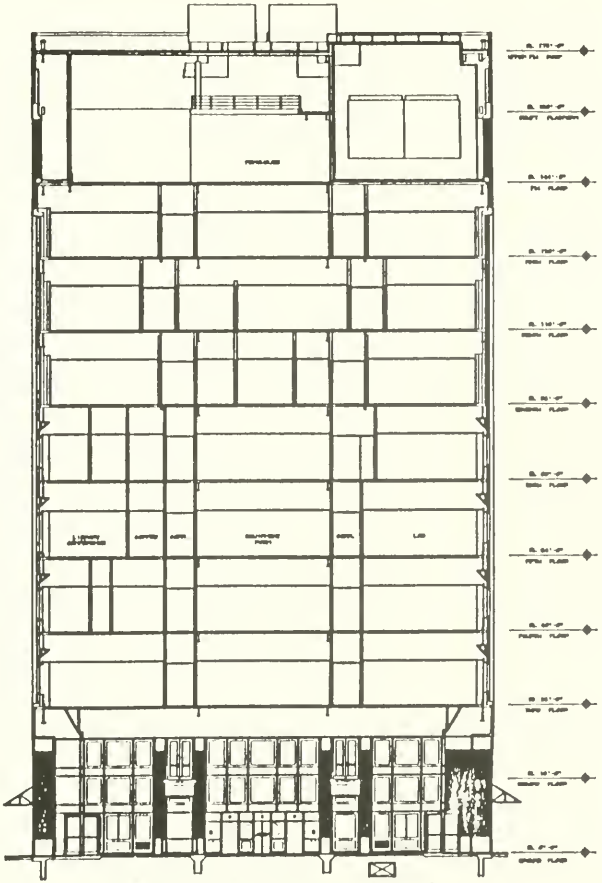

WEST ELEVATION
EAST ELEVATION
PROGRESS PRINT
NOT FOR CONSTRUCTION



SOUTH ELEVATION

Boston University
Center for Advanced
Biomedical Research

PROGRESS PRINT
NOT FOR CONSTRUCTION



TRANSVERSE BUILDING SECTION

Boston University
Center for Advanced
Biomedical Research

PROGRESS PRINT
NOT FOR CONSTRUCTION

BRA Resolution RE: Developer/Redeveloper

Designation and Authorization to Exececute Land Disposition Agreement

BRA Resolution RE: Minor Modifications to the South End Urban Renewal Plan

Terms and Conditions - Public Facilities
Land Acquisition Phasing

UNIVERSITY ASSOCIATES LIMITED PARTNERSHIP
SOUTH END TECHNOLOGY SQUARE PROJECT

OCTOBER 31, 1991

FIRST AGENDA ITEM	TAB
Memorandum to BRA Board and Stephen Coyle re: Developer Designation of Parcel 46B and Certain Property Adjacent thereto; Acquisition and Disposition of Parcel 46B; and Minor Modifications to South End Urban Renewal Plan.	1
BRA Resolutions re: Developer Designation and Authorization to Execute a Land Disposition Agreement.	2
BRA Resolutions re: Minor Modifications to the South End Urban Renewal Plan.	3
SECOND AGENDA ITEM	
Memorandum to BRA Board and Stephen Coyle and BRA Votes re: Adoption of Orders of Taking for Portions of Parcel 46B.	4

MEMORANDUM OCTOBER 31, 1991

TO: BOSTON REDEVELOPMENT AUTHORITY AND
STEPHEN COYLE, DIRECTOR

FROM: LINDA MONGELLI-HAAR, ASSISTANT DIRECTOR FOR
NEIGHBORHOOD PLANNING AND ZONING
THOMAS O'MALLEY, ASSISTANT DIRECTOR FOR
NEIGHBORHOOD HOUSING AND DEVELOPMENT
GERRY KAVANAUGH, DIRECTOR OF INSTITUTIONAL PLANNING
MICHAEL HUNTER, DEPUTY DIRECTOR FOR NEIGHBORHOOD
PLANNING AND ZONING

SUBJECT: UNIVERSITY ASSOCIATES/SOUTH END TECHNOLOGY SQUARE PROJECT: DEVELOPER DESIGNATION OF PARCEL 46B AND CERTAIN PROPERTY ADJACENT THERETO; ACQUISITION AND DISPOSITION OF PARCEL 46B; AND MINOR MODIFICATIONS TO SOUTH END URBAN RENEWAL PLAN, SOUTH END PROJECT, MASS. R-56.

EXECUTIVE SUMMARY: This memorandum requests that with regard to the University Associates/South End Technology Square Project, the Boston Redevelopment Authority ("BRA"): (1) designate University Associates Limited Partnership as the developer of Parcel 46B and certain property adjacent thereto in the South End Urban Renewal Area; (2) approve the terms and conditions for the conveyance of Parcel 46B to University Associates Limited Partnership recommended to the Authority by the Public Facilities Department, authorize the Director to enter into a Land Disposition Agreement with University Associates Limited Partnership upon such terms and conditions, and authorize certain action necessary in order to carry out such terms and conditions, and (3) adopt minor modifications of the South End Urban Renewal Plan in connection with the development of Parcel 46B. Specific conditions are outlined in the attached resolutions.

INTRODUCTION

On September 26, 1991, the Boston Redevelopment Authority ("BRA") approved a Planned Development Area Master Plan and Development Impact Project Plan (the "Master Plan PDA") and two PDA Development Plans for the South End Technology Square Development project (the "PDA Project"). The Master Plan PDA site consists of Parcel 46B in the South End Urban Renewal Area which is located

between Albany Street and the Massachusetts Avenue Connector, and between the so-called Flower Market building on Albany Street and the power generation plant of Boston City Hospital.

In furtherance of this project, University Associates Limited Partnership ("UALP"), a Massachusetts limited partnership, the general partners of which are the Trustees of Boston University and Univer Development Foundation, Inc., requests (1) designation as the developer of Parcel 46B and certain property adjacent thereto in the South End Urban Renewal Area, (2) approval of a Land Disposition Agreement pursuant to which Parcel 46B will be conveyed to UALP, and (3) adoption of minor modifications of the South End Urban Renewal Plan in connection therewith.

Master Plan PDA

The Master Plan PDA will allow for the creation of a major medical research center for the establishment of research laboratories affiliated with the medical institutions in the South End, and includes the construction of a total of 810,000 gross square feet of space in five buildings, in addition to a 1,000 space structured parking garage. Specifically, the Master Plan PDA proposes to construct one 180,000 square foot medical research building, one 140,500 square foot medical/office/research building, two 160,000 square foot medical/office/research buildings, a 250-room hotel comprised of 166,000 square feet, and one 1,000 car parking structure which will also contain child care and retail space on the ground level. All buildings along Albany Street will contain retail uses on the ground floor.

Development Plan for Center for Advanced Biomedical Research

A Development Plan for the first phase of the Master Plan was submitted to and approved by the BRA along with the Master Plan PDA. Such Development Plan allows for the construction of a 180,000 square foot medical research building at 700 Albany Street to be known as the Center for Advanced Biomedical Research. The building will be nine stories in height with a mechanical penthouse above the roof, and will include 6,600 square feet of retail space fronting onto Albany Street. This building will be the catalyst for other medical research and laboratory buildings within the site and will make a significant contribution to the prominence of Boston as a national leader in the biomedical research economy. Construction of the research building is anticipated to begin in the fourth quarter of 1991, with completion anticipated in late 1993.

Development Plan for Technology Square Garage

A second Development for the first phase of the Master Plan was submitted to and approved by the BRA along with the Master Plan PDA. Such Development Plan provides for the development of a 1,000 space parking garage at 710 Albany Street. The parking

area with seven (7) levels of parking, ground level retail space, and a child care center for 100 children. Construction of the parking facility would begin in the second quarter of 1992 and will be completed in early 1994.

PDA Project Phasing

It is anticipated that the PDA Project will be implemented in two phases, with several sub-phases within each phase.

Phase I will include the construction of the proposed 180,000 square foot biomedical research building, the 1,000 space parking garage, and a 160,000 square foot medical arts building. Construction of the medical research building is anticipated to begin in the Fall 1991, with completion in December, 1993. Construction of the parking garage is anticipated to begin in the second quarter of 1992, with completion anticipated in early 1994. Construction of the medical arts building is anticipated to begin in late 1992, with completion in late 1994.

Phase II includes two 160,000 square foot medical/office/research buildings, and a 250-room hotel comprised of 166,000 square feet, and is contemplated to begin in early 1996, with the total project to be completed in the year 2000.

DEVELOPER DESIGNATION

South End Urban Renewal Plan

Parcel 46B in the South End Urban Renewal Area is located between Albany Street and the Massachusetts Avenue Connector, and between 600 Albany Street, one of the flower market buildings, and the power generation plant of Boston City Hospital. Upon adoption of the minor modification of the South End Urban Renewal Plan discussed below, Parcel 46B will consist of approximately 8.5 acres land.

On September 29, 1983, the BRA adopted a Resolution (the "Tentative Designation") tentatively designating as redeveloper of Parcel 46B in the South End Urban Renewal Area a partnership called University Associates. At the time of the Tentative Designation, University Associates was a partnership between Mr. John Hall, Mr. Paul Nace and a non-profit partnership among Boston University Medical Center ("BUMC") and area business and institutional representatives called South End Technology Square Associates ("SETSA"), and was formed as the vehicle for the development of Parcel 46B. BUMC has now selected as successors to the partners of University Associates, the two main entities involved in the health care and medical research activities in the South End: Boston University and University Hospital. The direct involvement of such institutions provides added strength to the development team and will ensure the successful completion of a major and vitally important research center in the South End.

University Associates has been re-formed as UALP by the substitution of the original partners, John Hall, Paul Nace and SETSA with the admission of Univer Development Foundation, Inc., a subsidiary of University Hospital, and the Trustees of Boston University, as the partners of UALP. With the admission of the new partners and the formation of UALP as a recently formed limited partnership (whose general partners are the Trustees of Boston University and Univer Development Foundation, Inc.), UALP is able to undertake the development of Parcel 46B and has been responsible for all planning, design and approvals for the Project to date, including the Master Plan PDA.

The Master Plan PDA establishes development controls and parameters for the Project that are consistent with the Tentative Designation and the South End Urban Renewal Plan.

It is therefore recommended that the BRA approve the substitution of Univer Development Foundation, Inc. and the Trustees of Boston University as development partners and their formation of UALP as the appropriate entity to undertake the development of Parcel 46B as contemplated in the Urban Renewal Plan, as amended, and in accordance with the Master Plan PDA, and in furtherance of the development of Parcel 46B confirm and ratify the tentative designation of UALP as redeveloper of Parcel 46B, as approved successor to University Associates, and grant final designation of UALP as the redeveloper of Parcel 46B, in accordance with the appropriate resolutions attached hereto.

Chapter 30B Designation

In July, 1991, the BRA issued a Request for Proposals pursuant to M.G.L. Chapter 30B for the development of Parcel 46B and certain additional land adjacent thereto (collectively, the "Property"). The general partners of UALP (d/b/a University Associates prior to the formation of UALP) submitted a proposal (the "Development Proposal") dated August 5, 1991 for the acquisition of the Property from the BRA, which would acquire the property by exercise of its Power of Eminent Domain, for the development of a multi-use medical, research, office, garage and hotel project (the "Project").

The Public Facilities Department ("PFD") reviewed the Development Proposal on behalf of itself and the BRA. Based on such review, and following the procedure set forth in the RFP, the Public Facilities Department determined that the Development Proposal met all of the qualifying requirements and ranking criteria of the RFP, that the Development Proposal represented a most satisfactory response to the RFP, and that UALP be designated developer of the Property pursuant to Chapter 30B and all applicable urban renewal and BRA statutes and regulations.

In accordance with the RFP, PFD also engaged in negotiations with UALP concerning the terms and conditions for the conveyance of the

Property by BRA to UALP for the Project and achieved an understanding with UALP with respect thereto which satisfy the combined requirements of PFD, the Mayor's Office of Capital Planning, the Department of Health and Hospitals and the BRA. An appraisal of the Property was prepared and the damages to be awarded to the City of Boston ("City") for the contemplated acquisition of the City property by exercise of the BRA's Power of Eminent Domain are consistent with that appraisal and are acceptable to the City. PFD further requested Public Facilities Commission ("PFC") to require the BRA to incorporate such terms and conditions in the documentation concerning the designation and conveyance of the Property to UALP.

The Public Facilities Commission has approved the recommendations of the Public Facilities Department and has forwarded them to the BRA. The terms and conditions for the conveyance of the Property as recommended by PFC are attached hereto ("Terms and Conditions"), and are to be incorporated into the BRA's standard urban renewal form of Land Disposition Agreement (the "LDA").

It is therefore recommended that UALP be designated as the developer of the Property pursuant to Chapter 30B, subject to the LDA, and that the Terms and Conditions be accepted by the BRA and to be incorporated into the LDA, as appropriate, in accordance with the resolutions attached hereto.

ACQUISITION AND DISPOSITION OF THE PROPERTY

Under the terms of the LDA, the Property will be conveyed to UALP in two phases. The first phase consists of Parcel 46B which will be assembled and disposed of as follows: The BRA will acquire a portion of Parcel 46B from the City ("City Parcel") by exercise of the BRA's Power of Eminent Domain. The City Parcel, together with the portion of Parcel 46B which is currently owned by the BRA ("BRA Parcel"), will be the subject of a confirmatory taking by the BRA for title perfection purposes, then transferred simultaneously to UALP for the consideration provided for in the LDA.

Another portion of Parcel 46B will be transferred by the Commonwealth of Massachusetts to the City, by the City to the BRA and by the BRA to UALP pursuant to Chapter 762 of the Acts of 1962, as amended by Chapter 567 of the Acts of 1966 (the "Statute"). This transfer may occur subsequent to the initial transfer of the City Parcel and the BRA Parcel.

The second phase of the conveyance contemplated by the LDA involves the balance of the Property which consists of two Parcels. One parcel is currently owned by the BRA. The other parcel will be acquired by the BRA pursuant to the Statute if and when the Massachusetts Avenue Connector is relocated in connection with the Central Artery/Third Harbor Tunnel Project. The LDA contemplates that both of these parcels will be conveyed to UALP,

RESOLUTIONS OF THE BOSTON REDEVELOPMENT AUTHORITY REGARDING THE SOUTH END TECHNOLOGY SQUARE PROJECT IN THE SOUTH END URBAN RENEWAL AREA, PROJECT MASS. R-56, DESIGNATION OF UNIVERSITY ASSOCIATES LIMITED PARTNERSHIP AS DEVELOPER AND REDEVELOPER AND AUTHORIZATION TO EXECUTE A LAND DISPOSITION AGREEMENT

OCTOBER 31, 1991

1. CHAPTER 30B DEVELOPER DESIGNATION

WHEREAS, in July, 1991, the Boston Redevelopment Authority ("BRA") issued a Request for Proposals pursuant to M.G.L. Chapter 30B for the development of Parcel 46B in the South End Urban Renewal Area and certain additional land adjacent thereto (collectively, the "Property");

WHEREAS, the Trustees of Boston University ("BU") and Univer Development Foundation, Inc. ("UDF") doing business under the name of University Associates submitted a proposal (the "Development Proposal") dated August 5, 1991 for the acquisition of the Property from the BRA, which would acquire portions of the Property by exercise of its Power of Eminent Domain, for the development of a multi-use medical, research, office, retail, commercial, garage and hotel project (the "Project");

WHEREAS, University Associates Limited Partnership ("UALP"), a Massachusetts limited partnership, the general partners of which are BU and UDF, has been formed as the entity to continue the development of the Project formerly conducted by BU and UDF as University Associates;

WHEREAS, the Public Facilities Department ("PFD") reviewed the Development Proposal at the request of the Boston Redevelopment Authority ("BRA"); and based on such review, and following the procedure set forth in the RFP, the PFD requested the Public Facilities Commission ("PFC") to recommend to the BRA that the Development Proposal met all of the qualifying requirements and ranking criteria of the RFP, that the Development Proposal represented the most satisfactory response to the RFP, and that UALP be designated developer of the Property pursuant to Chapter 30B and all applicable urban renewal and BRA statutes and regulations;

WHEREAS, in accordance with the RFP, the PFD also engaged in negotiations with UALP concerning the terms and conditions for the conveyance of the Property by BRA to UALP for the Project and achieved an understanding with UALP with respect thereto which satisfy the combined requirements of PFD, the Mayor's Office of Capital Planning, the Department of Health and Hospitals and the BRA, which terms and conditions (the "Terms and Conditions") are set forth in a Memorandum from the PFD to the PFC dated October 25, 1991, a copy of which is attached hereto as Exhibit A;

WHEREAS, the Terms and Conditions confirm that Parcel 46B consists of the aggregate of the following parcels: Parcel H (the "City Parcel") consisting of approximately 6.03 acres currently owned by the City of Boston ("City"); Parcel J-1 consisting of approximately 1.02 acres and Parcel M consisting of approximately 14 square feet (together, the "BRA Parcels") both currently owned by the BRA; and Parcel K (the "State Parcel") consisting of approximately 1.19 acres currently owned by the Commonwealth of Massachusetts, all as shown on the plan entitled "Land Acquisition Plan Phase I in Boston, Mass. (South End District)" prepared by Bryant Associates, Inc. dated October, 1991, a copy of which is attached hereto as Exhibit B;

WHEREAS, the Terms and Conditions further confirm that the balance of the Property consists of the following two parcels: Parcel Q consisting of approximately 4.2 acres currently owned by the Commonwealth of Massachusetts, as shown on Sheets 1 and 2 of 2 of the plan entitled "Land Acquisition Plan in Boston, Mass. (South End District)" prepared by Bryant Associates, Inc.; and Parcel J-2 consisting of approximately 2.301 acres currently owned by the BRA, as shown on Sheet 2 of 2 of said plan, a copy of both of which is attached hereto as Exhibit C;

WHEREAS, it is anticipated that said Parcel Q will become available for development as a result of the relocation of the existing Massachusetts Avenue Connector in connection with the CA/THT Project, and that the configuration and area of said Parcel Q may be changed as a result thereof;

WHEREAS, an appraisal of the Property was prepared and the damages to be awarded to the City for the contemplated acquisition of the City Parcel by exercise of the BRA's Power of Eminent Domain are consistent with that appraisal and are acceptable to the City;

WHEREAS, the PFD further requested PFC to require the BRA to incorporate the Terms and Conditions in the documentation concerning the designation and conveyance of the Property to UALP; and the PFC has received PFD's recommendations and has forwarded them to the BRA;

The BRA finds that PFD's recommendations are appropriate and that the resolutions hereinafter set forth implementing the same should be adopted.

2. URBAN RENEWAL REDEVELOPER DESIGNATION

WHEREAS, the BRA has entered into a contract for loan and capital grant with the Federal Government under Title 1 of the Housing Act of 1949, as amended, which contract provides for financial assistance in the hereinafter identified Project Area;

WHEREAS, the Urban Renewal Plan for the South End Urban Renewal Area, Project No. Mass. R-56, (the "Project Area") has been duly reviewed and approved in full compliance with local, State and Federal law;

WHEREAS, the BRA is cognizant of the conditions that are imposed in the undertaking and carrying out of urban renewal projects with the Federal financial assistance under said Title 1, including those prohibiting discrimination because of race, color, sex, religion, or national origin;

WHEREAS, the BRA is cognizant of Chapter 30, Sections 61 through 62H of the Massachusetts General Laws, as amended, and its implementing regulations ("MEPA") with respect to minimizing and preventing damage to the environment;

WHEREAS, the BRA is cognizant of (1) the Draft Environmental Impact Report EEOA #7034 dated May 15, 1991 submitted to the Executive Office of Environmental Affairs ("EOEA") by UALP (then d/b/a University Associates) pursuant to MEPA, (2) the Certificate of the Secretary of Environmental Affairs on said Draft Environmental Impact Report dated June 28, 1991, (3) the Final Environmental Impact Report ("FEIR") dated August, 1991 submitted to the EOEA in response to said Certificate, and (4) the Certificate of the Secretary of Environmental Affairs on said Final Environmental Impact Report dated September 30, 1991, which stated that the FEIR adequately and properly complies with MEPA and that the MEPA Section 61 finding should be prepared based on the final disposition of the portion of the Property consisting of surplus Massachusetts Department of Public Works roadway lands scheduled to become available due to the CA/THT construction of the Massachusetts avenue connector (Parcel Q referenced above);

WHEREAS, the BRA and Boston University Medical Center ("BUMC") entered into a Cooperation Agreement dated March 15, 1967 in which Parcel 46B was designated as one of the sites for the future expansion of BUMC;

WHEREAS, BUMC subsequently joined a non-profit partnership of area business and institutional representatives called South End Technology Square Associates ("SETSA"), which, in turn, entered into a partnership with Mr. John Hall and Mr. Paul Nace called University Associates as the vehicle for the development of Parcel 46B;

WHEREAS, On September 29, 1983, the BRA adopted a Resolution (the "Tentative Designation") tentatively designating University Associates as redeveloper of Parcel 46B in the South End Urban Renewal Area;

WHEREAS, BUMC has now selected as successors to the partners of University Associates for the development of Parcel 46B, the two main entities involved in the medical and research activities in the South End: Boston University and University Hospital;

WHEREAS, University Associates has been re-formed as UALP by the substitution of the original partners, John Hall, Paul Nace and SETSA, by the admission of Univer Development Foundation, Inc., a subsidiary of University Hospital, and the Trustees of Boston University, as the general partners of UALP;

WHEREAS, with the admission of the new partners and the formation of UALP, UALP is able to undertake the development of Parcel 46B and has been responsible for all planning, design and approvals for the Project to date, which include the Planned Development Area Master Plan and Development Impact Project Plan (the "Master Plan PDA") and two PDA Development Plans for the South End Technology Square Development Project on Parcel 46B that were approved by vote of the BRA on September 26, 1991;

WHEREAS, the BRA finds that direct involvement of such institutions provides added strength to the development team for Parcel 46B and will ensure the successful completion of a major and important research center in the South End;

WHEREAS, the Master Plan PDA establishes development controls and parameters for the Project that are consistent with the Tentative Designation and the South End Urban Renewal Plan;

WHEREAS, UALP has duly filed a Redeveloper's Statement for Public Disclosure" (Federal Form H-6004) in accordance with Section 105(E) of the Housing Act of 1949;

WHEREAS, satisfactory evidence of the availability of necessary equity funds and other financing and a proposed development and rent schedule for the Project was provided by UALP to the BRA in UALP's Development Proposal;

WHEREAS, the Development Plan and the Master Plan PDA contemplate that the Project will be developed in phases, and UALP has provided the BRA with final working drawings and specifications for the Center For Advanced Biomedical Research, which will be the first component of the Project to be constructed pursuant thereto;

WHEREAS, final working drawings and specifications for each of the other components of the Project will be submitted to the BRA pursuant to the Cooperation Agreement between UALP and the BRA with respect to the Master Plan PDA, and will be subject to the BRA Development Review Procedures provided for therein;

WHEREAS, in an Agreement Between Boston University and the City of Boston Relative to the Transfer of the Commonwealth Armory from the Commonwealth of Massachusetts to Boston University dated December 1, 1984, as amended, (the "Armory Agreement"), BU agreed that during a certain period BU will not proceed with an property acquisition and development activities outside the University Campus without notice to and written approval of the BRA;

WHEREAS, BU has duly notified the BRA of its participation in the Project as a partner in UALP and requested the BRA to approve such participation for the purposes of the Armory Agreement, and BRA finds that such approval should be granted;

NOW THEREFORE, BE IT RESOLVED BY THE BOSTON REDEVELOPMENT AUTHORITY:

That University Associates Limited Partnership, the general partners of which are the Trustees of Boston University and Univer Development Foundation, Inc., is hereby designated as the developer of the Property pursuant to M.G.L. Chapter 30B.

That the Tentative Designation of University Associates Limited Partnership, the general partners of which are the Trustees of Boston University and Univer Development Foundation, Inc., successor in interest to University Associates, as redeveloper of Parcel 46B in the South End Urban Renewal Area is hereby ratified, confirmed and approved by the BRA;

That the participation of the Trustees of Boston University in the Project is hereby approved by the BRA under the Armory Agreement and the Director is hereby authorized to confirm such approval in writing on behalf of the BRA;

That the BRA hereby grants final designation to University Associates Limited Partnership as redeveloper of Parcel 46B in the South Urban Renewal Area;

That it is hereby determined that University Associates Limited Partnership possesses the qualifications and financial resources necessary to acquire and develop land in accordance with the South End Urban Renewal Plan and the Project Area;

That disposal of Parcel 46B by negotiation is the appropriate method of making the land available for redevelopment;

That it is hereby found and determined pursuant to MEPA that the proposed Project will not result significant damage to the environment and further, that all practicable feasible means and measures have been taken to avoid or minimize

damage to the environment, except to the extent that such findings relating to Parcel Q shall be made on the final disposition thereof as indicated in the FEIR Certificate ;

That the development parameters and controls set forth in the Master Plan PDA pursuant to which the Project will developed on Parcel 46B are consistent with the South End Urban Renewal Plan, as amended, (the "Plan"), including, without limitation, Chapter VI thereof, and compliance of the Project with the Master Plan PDA shall constitute compliance with the Plan;

That the Project currently complies with the Plan;

That the Director is hereby authorized for and on behalf of the BRA to execute and deliver a Land Disposition Agreement, a License for early entry for purposes of site preparation and construction and Deed or Deeds conveying Parcel 46B to University Associates Limited Partnership, by one or more conveyances of the whole or any part thereof, each in the BRA's usual form modified as appropriate to reflect the Terms and Conditions attached hereto as Exhibit A (including, without limitation, the provisions thereof concerning the conveyance of the State Parcel pursuant to Chapter 762 of the Acts of 1962, as amended by Chapter 567 of the Acts of 1966), and such other modifications as the Director, in his discretion, shall deem necessary or appropriate, including, without limitation, modifications permitting University Associates Limited Partnership to convey portions of Parcel 46B to adjacent property owners and/or the City of Boston;

That the Director be and hereby is authorized and directed to execute and deliver on behalf of the BRA such further documents in connection with said Land Disposition Agreement (including amendments thereto) or the Project as the Director, in his discretion, shall deem necessary or desirable to implement the transactions contemplated in the Terms and Conditions, the Land Disposition Agreement or any of these Resolutions of the BRA;

That the Secretary is hereby authorized and directed to publish notice of the proposed disposal transaction in accordance with Section 105(E) of the Housing Act of 1949, as amended, including information with respect to the "Redeveloper's Statement for Public Disclosure" (Federal Form H-6004); and

That the Director is hereby authorized to file with the Deputy Commissioner of Capital Planning and Operation a disclosure of beneficial interest statement on behalf of the BRA with respect to the proposed disposal transaction pursuant to M.G.L. Chapter 7, Section 40J.

LIST OF EXHIBITS

Exhibit A	Memorandum from PFD to PFC dated October 25, 1991 re: Terms and Conditions for the Conveyance of Parcel 46B.
Exhibit B	Land Acquisition Plan Phase I
Exhibit C	Land Acquisition Plan Sheets 1 and 2

EXHIBIT A

M E M O R A N D U M

TO: Public Facilities Commission

FROM: Public Facilities Department

DATE: October 25, 1991

RE: Terms and Conditions for the Conveyance of Parcel 46B

The Public Facilities Department ("PFD"), acting in response to the request of the Boston Redevelopment Authority ("BRA") as set forth in that certain letter from Thomas O'Malley, Assistant Director, Neighborhood Housing & Development, BRA to Paul Roche, Esquire, General Counsel, PFD, dated June 28, 1991, has reviewed the proposal dated August 5, 1991 ("Development Proposal") submitted by University Associates, a joint venture of the Trustees of Boston University ("BU") and University Hospital ("UH"), now formed as a Massachusetts limited partnership under the name of University Associates Limited Partnership, its successors and assigns ("UA") for the acquisition of Parcel 46B including the additional land referenced therein ("Property") from the BRA which will exercise its Power of Eminent Domain to acquire the Property, and for the development of a multi-use medical, research, office, garage and hotel project ("Project"). Such Development Proposal was submitted in response to the Request for Proposals issued by the BRA in July, 1991 ("RFP") pursuant to and in accordance with Chapter 30B. In accordance with the schedule outlined in Section 4 of the RFP and the submission requirements set forth in Section 5 of the RFP, PFD requests that the Public

Facilities Commission ("PFC") recommend to the BRA that the Development Proposal of UA has met all of the qualifying requirements and ranking criteria of the RFP, that the Development Proposal represents the most satisfactory response to the RFP, and that UA be designated developer of the Property pursuant to Chapter 30B and all applicable urban renewal and BRA statutes and regulations.

Additionally, in accordance with the RFP, PFD has engaged in negotiations with UA relative to the terms and conditions of the conveyance of the Property by the BRA to UA for the Project. PFD has achieved an understanding with UA based upon the following terms and conditions, which satisfy the combined requirements of PFD, the Mayor's Office of Capital Planning ("OCP"), the Department of Health and Hospitals ("DHH") and the BRA. An appraisal of the Property has been prepared and the damages to be awarded to the City of Boston ("City") for the contemplated acquisition of the City property by the Power of Eminent Domain by the BRA are consistent with that appraisal and are acceptable to the City. PFD requests that PFC require the BRA to incorporate such terms and conditions in the designation memoranda or other documents executed at the time of the designation and/or the conveyance of the Property.

1. Phased Acquisition of the Property. The Property consists of the following parcels defined by ownership and generally described as follows: a parcel of land now owned by the City containing approximately 6.03 acres ("Parcel H"); a parcel of

land now owned by the BRA containing approximately 1.02 acres ("Parcel J-1"); a parcel of land now owned by the BRA containing approximately 2.301 acres ("Parcel J-2"); a parcel of land now owned by the Commonwealth of Massachusetts ("Commonwealth") under the care, custody and control of the Department of Public Works containing approximately 1.21 acres ("Parcel K"); and a parcel of land now owned by the Commonwealth of Massachusetts under the care, custody and control of the Department of Public Works, which will result from the relocation of the present Massachusetts Avenue Connector as part of the Central Artery Third Harbor Tunnel Project ("CAT/T Project") containing approximately 4.2 acres ("Parcel Q"). All said parcels were referenced in the RFP and for clarification are shown on a plan entitled "Acquisition Plan" prepared by Bryant Associates, Inc., October 1991, (Progress Print subject to confirmation of parcel areas) attached hereto as Exhibit A. Parcel H, Parcel J-1 and Parcel K together contain approximately 8.26 acres, comprise the present area of Parcel 46B ("Site") and are to be conveyed to UA for the development of the Project. The Site is shown on a plan entitled "Acquisition Plan-Phase I" prepared by Bryant Associates, Inc. October 1991 (Progress Print subject to confirmation of parcel areas) and attached hereto as Exhibit B. Parcel J-2 shall remain in its present status as surface parking lot under a license from the City of Boston acting by and through the PFC to BUMC. Upon the relocation of the present Massachusetts Avenue Connector as part of the CAT/T Project, Parcel Q and Parcel J-2 ("Future Development

Site") shall be conveyed to UA. Parcel Q shall be conveyed by the City to the BRA and then by the BRA to UA after acquisition by the City from the Commonwealth and approval of a development plan for the Future Development Site by the BRA. The City consents to the BRA's taking of Parcel Q, Parcel K or any other portion of state land to be conveyed to the City pursuant to the Statute for purposes of transfer to UA. Parcel J-2 shall be transferred to UA by the BRA. It is contemplated that Parcel K and Parcel Q will be conveyed through the operation of Chapter 762 of the Acts of 1962 as amended by Chapter 567 of the acts of 1966 ("Statute") as contemplated in the RFP and the Development Proposal. In cases of conflict between the Terms and Conditions contained herein and the Statute, the provisions of the Statute shall be binding, except that the City and UA agree that the Terms and Conditions relating to the payment of consideration for Parcel K as set forth in section 14(a) shall govern the actions of the City, BRA and UA. The Future Development Site (Parcel J-2 and Parcel Q) is shown on a plan entitled "Acquisition Plan-Phase II" prepared by Bryant Associates, Inc. October 1991 (Progress Print subject to confirmation of parcel areas) and attached hereto as Exhibit C.

2. Development Schedule. The Project will be developed in two phases: Phase I will consist of the development of the Center for Advanced Biomedical Research by Boston University, the Medical Arts Building by University Hospital and Technology Square Garage by UA. It is expected that construction on the Center for Advanced Biomedical Research will commence in the fourth quarter

of 1991 and will take approximately 18 to 24 months to complete. Additionally, construction on the 1,000 car parking garage known as Technology Square Garage is expected to commence in the second quarter of 1992 with a construction period of approximately 18 months. It is expected that development and construction of the Medical Arts Building by University Hospital will occur in the third or fourth quarter of 1992. All development activity and phasing will be subject to the Master Plan for Planned Development Area No. 41 approved by the BRA on September 26, 1991 ("Master Plan PDA").

3. DHH and BUMC Parking. The City acting by and through PFD and UA have entered into a Memorandum of Understanding dated as of October , 1991 ("MOU"), attached hereto as Exhibit D, relative to the relocation of DHH parking spaces and the Helipad on the Site. As set forth in the MOU, this relocation is for purposes of the initial development activity during Phase I. The terms of the Memorandum of Understanding as well as terms relating to the continuation of BUMC parking on Parcel J and the terms relating to permanent parking facilities for DHH as contained herein will be incorporated into the Land Disposition Agreement ("LDA") to be executed by UA and the BRA.

4. Discharge of HUD Mortgage. PFD and UA agree to cooperate to obtain from the Bond Trustee, HUD and HHS, as such are defined in the bond documents for the revenue bond for the new Inpatient Care Facility at Boston City Hospital, approvals for the release of the mortgage granted by the City on a portion of the Site, if

such release is required. PFD will coordinate with the BRA to insure that BRA actions will not cause the City to default in its obligations under the mortgage and bond documents. If the BRA determines to exercise its Power of Eminent Domain to acquire the City Property, no such Taking or Acquisition shall occur unless and until HUD, HHS and the Bond Trustee have released the HUD mortgage or determined that no such release is required. PFD, OCP, DHH and the BRA agree to cooperate with UA to pursue diligently the release of the HUD mortgage, unless it is determined that no such release is required.

5. Daycare. The Project plans provide for the development of a daycare facility within Technology Square Garage. In response to community and DHH concerns, one-third of the proposed 100 daycare slots shall be made available to DHH and South End residents in the following proportion: 23 of the 33 slots shall be allocated to DHH and 10 of the 33 slots shall be allocated to South End Community residents. If the daycare facility contains less than 100 slots, then the number allocated to DHH and the community residents shall be reduced proportionally.

6. Payment in lieu of Taxes (PILOT). UA will be required to commence negotiations with the Mayor's Office and the Assessing Department in connection with a PILOT Agreement relative to any portions of the property which will be exempt from real estate taxation. UA agrees to commence such discussions within 60 days after the vote by PFC recommending UA as the designated developer.

7. Helipad. UA shall be required to provide a feasibility study for the determination of a permanent location for the Helipad. Such study shall be prepared forthwith and the scope of such study shall be jointly agreed to by DHH and UH. Additionally, any relocation of the helipad, other than the initial relocation referenced in the MOU, shall be subject to DHH and UH approval, and the cost of such relocation shall be borne by UA. In the event that the Helipad is located on land owned by UA, UA agrees to enter into a binding agreement with DHH and UH for access to the Helipad.

8. Line of Credit. UA will be required to establish a $200,000 line of credit to be available to the City for costs incurred in obtaining the release of the HUD mortgage or the determination that such release is not required. The City shall not be obligated to repay to UA the amounts drawn on such line of credit.

9. Linkage. UA will be required to comply with Articles 26 26A and 26B of the Boston Zoning Code and enter into a Development Impact Project Agreement with the Boston Redevelopment Authority with respect to Housing and Jobs linkage.

10. Laboratory Animal Care Services. The Center for Advanced Biomedical Research shall provide access to the laboratory animal care services to BCH researchers on the same basis as such facilities are available to Boston University School of Medicine faculty members for so long as BCH and Boston University School of Medicine maintain their present affiliation.

11. Boston Resident Construction and Permanent Jobs. UA will be required to enter into an agreement with the BRA relative to the compliance with the Boston Residents Construction Jobs Plan. UA will also be required to enter into a First Source Agreement and a Memorandum of Understanding concerning permanent jobs.

12. Design Review. The Project shall be subject to design review by the BRA in accordance with the BRA's requirements and the Master Plan PDA.

13. Acquisition and Conveyance of the Property. The Property is to be acquired in two phases, and each phase may have one or more development sub-phases. As set forth herein, the BRA intends to acquire the City Property of the Site by the exercise of the Power of Eminent Domain and thereafter to convey the Site to UA pursuant to the LDA. The Site, consisting of Parcel H, Parcel J-1 and Parcel K shall be conveyed by the BRA to UA as the first phase of the acquisition. The Future Development Site shall be conveyed by the BRA to UA as the second phase of the acquisition upon the availability of the land resulting from the CAT/T Project and the approval of a development plan by the BRA. Parcel J-2 shall be conveyed by the BRA to UA. When the City acquires title to Parcel Q, it shall be conveyed by the City to the BRA pursuant to the Statute and the BRA shall thereupon convey Parcel Q to UA. The City consents to the BRA's taking of Parcels K, Q and any portion of state land for transfer to UA. Notwithstanding the designation of UA as developer of such Future

Development Site, nothing contained herein shall be deemed to establish the value of such site, and the purchase price for such site shall be determined at the time of development plan approval by the BRA and shall be based upon the fair market value of the land as of that date based upon appraisal(s) as required by the Statute or applicable BRA regulations. UA shall be responsible for the cost of all appraisals required in connection with the acquisition of the Future Development site.

14. Acquisition and Conveyance of the Site.

(a) The Consideration for the Site to be paid by UA to the BRA includes the value of Parcel K, which will be subject to the appraisal process referenced in the Statute and which will be conveyed subsequent to the acquisition of Parcel H and Parcel J-1 by UA. Therefore, UA will not be obligated to pay any additional consideration for Parcel K. In the event that the City is required to pay to the Commonwealth consideration for the conveyance of Parcel K or any portion thereof, the City shall be solely responsible for such obligation and shall not require UA to make any payment or contribution for Parcel K or any portion thereof in addition to the amounts set forth below.

(b) The Master Plan PDA references a Project with a total phased build-out of approximately 1,177,300 square feet of floor area within six (6) buildings ("Development Components") on six (6) sub-parcels shown on the Parcel Plan entitled "University

Associates Development Plan" submitted to and approved by the BRA as part of the Master Plan PDA ("Sub-parcels"). A copy of such Parcel Plan is attached hereto as Exhibit E.

(c) The Development Components and the phasing of the Project (Development Phase I and Development Phase II) are as follows:

Development Phase I:

Development Component A: 1,000 car parking garage on Sub-parcel A;

Development Component B: a 180,000 sq.ft. biomedical research building on Sub-parcel B;

Development Component C: a 160,000 sq.ft. medical arts building on Sub-parcel C;

Development Phase II:

Development Component D: a 140,500 sq.ft. research/office building on Sub-parcel D;

Development Component E: a 160,000 sq.ft. research/office building on Sub-parcel E;

Development Component F: a 166,000 sq.ft. hotel on Sub-parcel F.

(d) The determination of the Value or Consideration for the Site to be paid by UA to the BRA was based upon an analysis of the phased development of the Development Components over a ten (10) year or longer period, and is reflected in following elements:

(i) The Purchase Price to be paid by UA to the BRA; and

(ii) The construction and operation for 30 years of 600 parking spaces within one or more structured self-park parking facilities to be located within the Site for the exclusive benefit and use of the City through DHH, which is to be memorialized in a lease or other agreement acceptable to the City containing provisions for the proper operation and management of the facilities at no expense to the City and provisions requiring UA's lender to enter into non-disturbance and attornment agreements with the City, so that the City's lease will not be adversely affected by a default by UA of its obligations to its lender, such lease to be executed between UA and the City simultaneously upon the conveyance of the Site to UA by the BRA and containing provisions for the relocation of 481 surface parking spaces during the construction of Development Phase I ("Improvement Value"). Such lease shall also contain a provision granting the City an option to renew such lease for an additional period of 20 years at the same amount then being charged to other institutional users of similar parking spaces (fair market value).

(e) The value of Sub-parcel A equals $2,500,000, the value of Sub-parcel B equals $3,350,000, and the value of Sub-parcel C equals $3,350,000. The total value of Sub-parcels A, B and C in Development Phase I equals $9,200,000. The total value of Sub-

parcels D, E and F in Development Phase II equals $7,745,000. The Sub-parcel Value for D, E and F is represented in terms of floor area value ("FAR value") as follows:

Sub-parcel D Value:	Gross floor area of Development Component D x commercial FAR value of $20.78 = $2,920,000
Sub-parcel E Value:	Gross floor area of Development Component E x commercial FAR value of $20.78 = 3,325,000
Sub-parcel F Value:	Gross floor area of Development Component F x hotel FAR value of $9.04 = 1,500,000
	Total $7,745,000

(f) The calculation of the Purchase Price and the Improvement Value for Development Phase I and Development Phase II was made as follows:

Development Phase and Sub-parcel Value	Present Value
Development Phase I:	
Sub-parcels A, B and C:	$ 9,200,000
Value of 300 garage parking spaces at a cost of $12,000 per space:	(3,600,000)
Value of operating 600 parking spaces at an estimated annual cost of $550 per space:	(3,300,000)
PURCHASE PRICE:	2,300,000
Development Phase II:	
Sub-parcels D, E and F:	7,745,000
Value of 300 garage spaces at a $12,000 per space cost increased over ten (10) years at a cpi rate of approximately 4.5%:	(5,500,000)

PURCHASE PRICE: 2,245,000

(g) The Purchase Price to be paid by UA to the BRA for Sub-parcels A, B, C, D, E and F equals $4,545,000, provided that UA "pays" the Improvement Value Consideration by constructing and operating 600 parking spaces for DHH within one or more structured self-park parking facilities within the Site. The LDA shall provide that the Purchase Price paid by UA to the BRA shall be in the amount of $2,300,000 as an initial payment with a purchase money mortgage granted to the BRA in the amount of $2,245,000 ("Mortgage"). The Mortgage shall be on Sub-parcels D, E and F only, and shall be allocated on a pro rata basis. The LDA shall provide for partial releases of such Mortgage upon the payment of the pro-rata mortgage amounts on the Sub-parcel in order to proceed with a Development Component on a Sub-parcel upon the approval of a development plan and all approvals by the BRA and the City. The Mortgage shall not require the payment of interest on the principal, nor shall the Mortgage require the payment of principal until the earlier of (i) the Payment Date, defined in Section 14(j) herein, or (ii) the Reversion Date, as defined in Section 16 herein. The BRA shall pay to the City the City's pro-rata share of the amount of $2,300,000 upon the first to occur: the date on which the BRA receives payment from UA, or the date upon which payment is required pursuant to Chapter 79 of the General Laws, but no earlier than the receipt of such payment from

UA. The BRA shall pay to the City the City's pro-rata share of the amounts received in payment of the Mortgage from UA when such sums are received by the BRA.

(h) The LDA shall also provide for an increase in the Purchase Price for the Site based upon changes in the gross floor area of a Development Component and an increase or decrease in the Purchase Price for the Site based upon changes in the market value of the Sub-parcel as of the time of the development of a Development Component in Development Phase II ("Purchase Price Adjustments"). The Purchase Price Adjustments shall be determined in the following manner:

(i) Upon the submission of a development plan to the BRA for a Development Component on one or more of the Sub-parcels in Development Phase II (either D, E, or F), the gross floor area of the Development Component shall be determined. If the gross floor area of the Development Component is greater than the gross floor area of the Development Component described in the Master Plan PDA, then UA shall pay to the BRA the amount by which the product of the proposed gross floor area multiplied by the FAR value set forth in section 14(e) herein exceeds the Sub-parcel Value set forth in section 14(e) herein. Such amount shall be referred to as the Additional Gross Floor Area Consideration.

(ii) In addition to the determination of the Additional Gross Floor Area Consideration, an appraisal shall be made of the fair market value of the Sub-parcel based upon the

proposed gross floor area of the Development Component for such Sub-parcel. Based upon such appraisal an FAR value shall be determined and shall be referred to as the "Appraised FAR value". If the Appraised FAR value is greater than the FAR value set forth in Section 14(e) herein, then UA shall pay to the BRA one-third of the amount by which the product of the proposed gross floor area of the Development Component multiplied by the Appraised FAR value exceeds the proposed gross floor area multiplied by the FAR value set forth in section 14(e) herein ("Additional Consideration"). If the Appraised FAR value is less than the FAR value set forth in section 14(e) herein, then UA shall be entitled to a credit to the Mortgage in an amount by which the product of the proposed gross floor area of the Development Component multiplied by the Appraised FAR value is less than the proposed gross floor area multiplied by the FAR value set forth in section 14(e) herein ("Purchase Price Credit").

(i) Upon the expiration of the last appeal period from the issuance of all BRA and City approvals for the Development Component to be constructed on the Sub-parcel, all adjustments to the purchase price shall be made by the parties ("Payment Date"). In the event that the Purchase Price Credit is more than the Mortgage on such Sub-parcel, UA shall be entitled to accrue the overage as a credit on the next Sub-parcel to be developed in

Development Phase II. This procedure shall be repeated until the final development plan for the last sub-phase in Development Phase II of the Project is approved by the BRA.

(j) In no event shall the Purchase Price Credit be applied against the Improvement Value in Phase II of $5,500,000.00, and the obligation to provide a total of 600 parking spaces within one or more structured self-park parking facilities shall remain the obligation of UA, subject to the right to repurchase contained herein.

(k) The appraisal process for determining the fair market value of Sub-parcels D, E and F shall be consistent with appraisal processes with respect to urban renewal dispositions in the City of Boston. One appraiser would be selected by UA, a second appraiser would be selected by PFD. If there is a variance between the appraisals of more than ten percent (10%), then the appraisers shall agree upon the appointment of a review appraiser whose determination of the fair market value based upon review of the two appraisals shall be final and binding upon the parties. In the event that the difference between the first two appraisals is less than ten percent (10%), then the higher appraisal shall be the determination of fair market value of such Sub-parcel. The Appraisal Date shall be the date of approval of a development plan by the BRA for the Development Component in Development Phase II.

15. Improvement Value.

(a) The Improvement Value shall be referenced in the LDA as a covenant to provide 600 parking spaces within one or more structured self-park parking facilities during the two development phases. Additionally, LDA shall require UA to provide DHH with 481 surface parking spaces in accordance with the MOU within Parcel H of the Site upon commencement of construction of Development Component B. Such surface spaces shall be increased to 600 surface parking spaces upon the demolition of the adjacent Strumph building and the completion of a surface parking lot for BUMC on the Strumph site. The construction of Development Component C on Sub-parcel C shall not commence prior to the commencement of construction of Technology Square Garage. Upon the completion of Technology Square Garage, UA shall provide DHH with 300 parking spaces within the garage and 300 surface parking spaces within the Site, which surface spaces shall be situated so as not to materially diminish the access currently enjoyed by DHH employees. The surface parking spaces shall be replaced with parking spaces within a structured self-park parking facility in accordance with the following schedule:

(i) upon the approval of a development plan and all permits by the BRA and the City for Development Component D on Sub-parcel D in Development Phase II, UA shall provide 100 parking spaces within Technology Square Garage;

(ii) upon the approval of a development plan and all permits by the BRA and the City for Development Component E on Sub-parcel E in Development Phase II, UA shall provide 100 parking spaces within a structured self-park parking facility; and

(iii) upon the approval of a development plan and all permits by the BRA and the City for Development Component F on Sub-parcel F in Development Phase II, UA shall provide 100 parking spaces within a structured self-park parking facility.

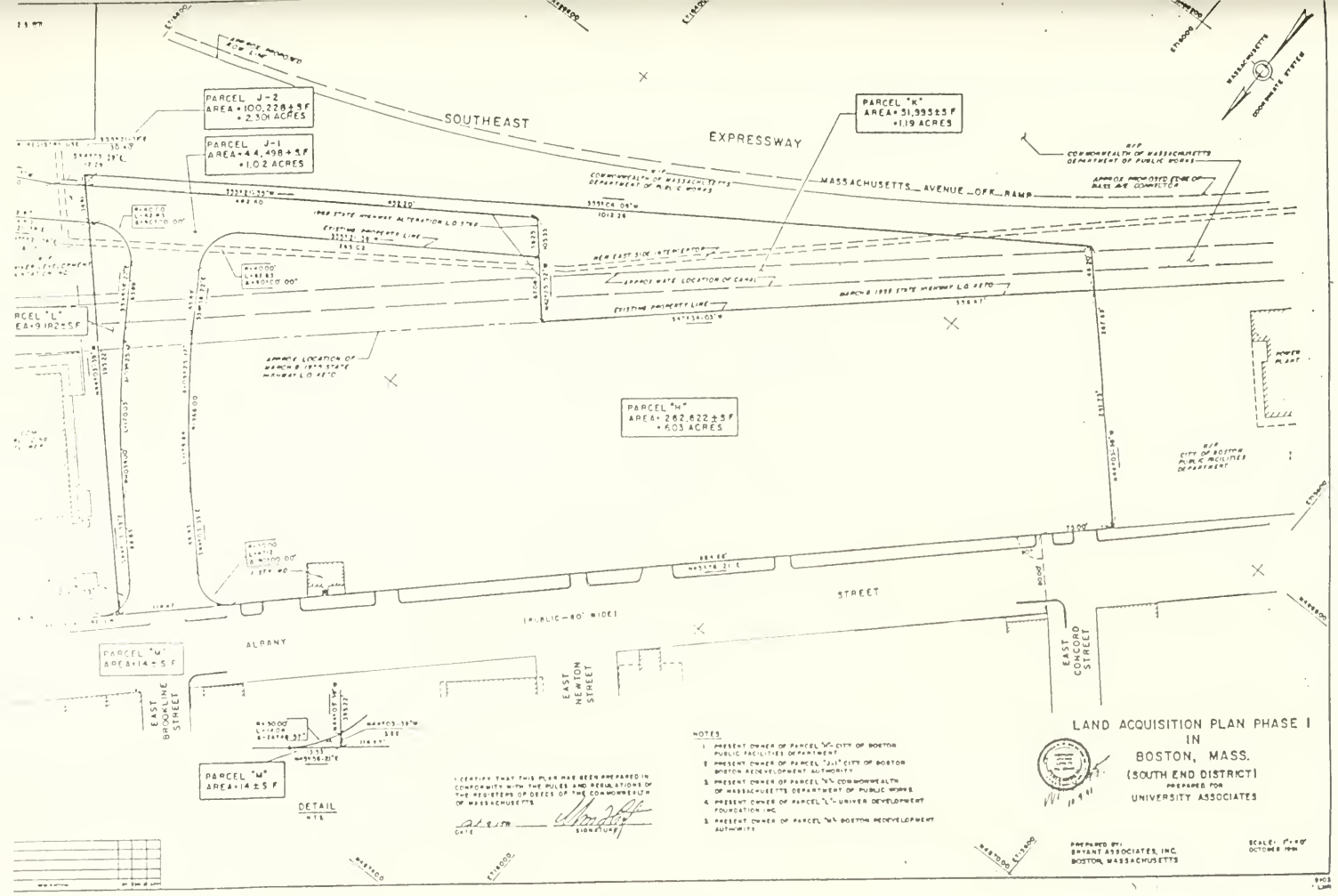
(b) The requirements in (a), (i), (ii) and (iii) above may be satisfied at the option of UA by the allocation of such spaces in Technology Square Garage, or provided that UA has complied with the covenant to provide DHH with 400 parking spaces within Technology Square Garage, by the allocation of such spaces within other structured self-park parking facility(s) within the Site.

(c) The Improvement Value of providing parking within one or more structured self-park parking facilities in the amount of $3,600,000 during Development Phase I and $5,500,000 during Development Phase II shall not be adjusted based upon the actual development costs of such facilities. Additionally, UA shall have the right to offer to purchase the City's leasehold rights in the parking spaces at an amount equal to the fair market value of such parking spaces at the time of the exercise of the offer to

purchase the parking spaces from the City. The City shall have the right in its sole and absolute discretion to accept or reject such offer.

16. Reversion. In order to insure that UA completes the construction of the Project, including the development of the 600 parking spaces within one or more structured self-park parking facilities, the LDA shall contain provisions for a reversion of the undeveloped portions of the Site to the BRA, if on the tenth (10) anniversary date of the initial conveyance of the Site ("Reversion Date"), UA has defaulted in its obligations either to commence the construction on all sub-phases of the Project, or to provide the 600 parking spaces. Such reversion provision shall be in accordance with the standard HUD provisions applicable to urban renewal projects, including extensions of time for performance by a developer. UA shall have the right to extend the Reversion Date for a ten (10) year period by amending the Additional Consideration formula, set forth in Section 14(h)(ii) herein, by paying to the BRA one-half (1/2) of the amount by which the product of the proposed gross floor area of the Development Component multiplied by the Appraised FAR value exceeds the proposed gross floor area multiplied by the FAR value set forth in section 14(e) herein in lieu of one-third (1/3) of said amount as set forth in section 14(e)(ii).

17. License. The City agrees to grant UA a license for test borings and pits in connection with 21E studies and site preparation work relating to redesign of the parking areas and excavation and site work for Development Component B.


SOUTHEAST
EXPRESSWAY
MASSACHUSETTS AVENUE OFF RAMP
PARCEL J-2
AREA = 100,228 ± S.F.
= 2.301 ACRES
PARCEL J-1
AREA = 44,498 ± S.F.
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AREA = 14 ± S.F.
PARCEL "N"
AREA = 14 ± S.F.
ALBANY
STREET
(PUBLIC - 80' WIDE)
EAST BROOKLINE STREET
EAST NEWTON STREET
EAST CONCORD STREET
DETAIL
NOTES
1. PRESENT OWNER OF PARCEL "K" - CITY OF BOSTON PUBLIC FACILITIES DEPARTMENT
2. PRESENT OWNER OF PARCEL "J-1" CITY OF BOSTON BOSTON REDEVELOPMENT AUTHORITY
3. PRESENT OWNER OF PARCEL "N" COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
4. PRESENT OWNER OF PARCEL "L" - UNIVER DEVELOPMENT FOUNDATION, INC.
5. PRESENT OWNER OF PARCEL "M" BOSTON REDEVELOPMENT AUTHORITY
I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS
DATE
SIGNATURE
LAND ACQUISITION PLAN PHASE I
IN
BOSTON, MASS.
(SOUTH END DISTRICT)
PREPARED FOR
UNIVERSITY ASSOCIATES
PREPARED BY:
BRYANT ASSOCIATES, INC.
BOSTON, MASSACHUSETTS
SCALE: 1" = 40'
OCTOBER 1966

EXHIBIT B

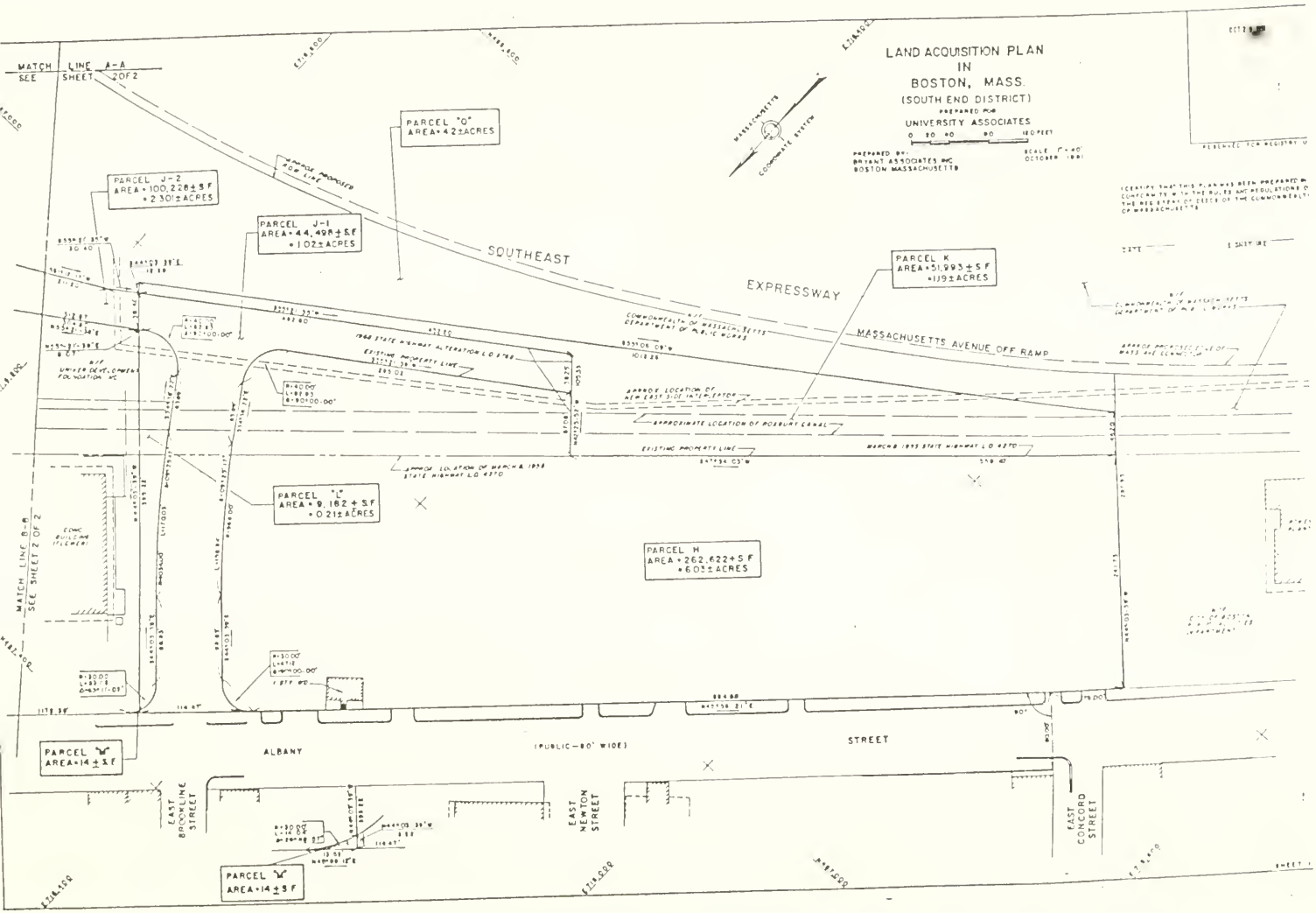


EXHIBIT C, SHEET 1

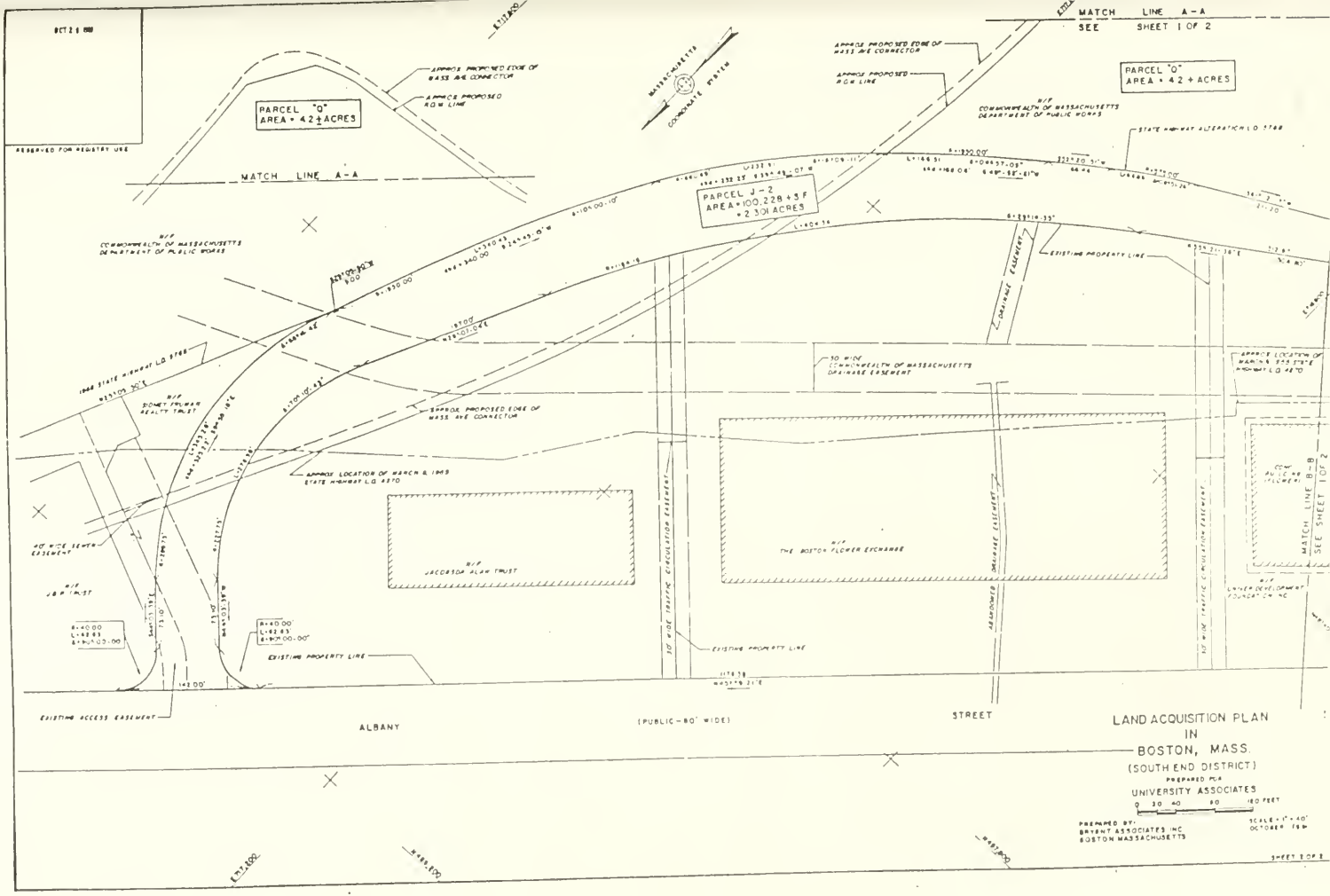


EXHIBIT C, SHEET 2

RESOLUTIONS OF THE BOSTON REDEVELOPMENT AUTHORITY REGARDING MINOR MODIFICATIONS TO THE SOUTH END URBAN RENEWAL PLAN, MASS. PROJECT R-56, WITH RESPECT TO PARCEL 46B AND PARCEL 48A OF THE SOUTH END URBAN RENEWAL AREA

OCTOBER 31, 1991

WHEREAS, the Urban Renewal Plan for the South End Urban Renewal Area, Project No. Mass. R-56, was adopted by the BRA on September 23, 1965 and approved by the City Council of the City of Boston on December 6, 1965 (said plan, as amended, being herein referred to as the "Plan");

WHEREAS, Section 1201 of Chapter XII of said Plan entitled: "Modification and Termination" provides that the Urban Renewal Plan may be modified at any time by the Boston Redevelopment Authority ("BRA") without further approval, provided that the proposed modifications do not substantially or materially alter or change the Plan;

WHEREAS, it is the opinion of the BRA that the modifications hereinafter provided with respect to Parcel 46B and Parcel 48A of the South End Urban Renewal Area are consistent with the objectives of the South End Urban Renewal Plan;

WHEREAS, the proposed amendments to the Plan are minor modifications and may be adopted within the discretion of the BRA pursuant to Section 1201 thereof;

WHEREAS, the proposed amendments to the Plan set forth below are necessary to effectuate the redevelopment of Parcel 46B of the South End Urban Renewal Area by University Associates Limited Partnership;

WHEREAS, Parcel 48A is owned by one of the general partners of UALP, and a portion of 48A has been included in the Master PDA, and it is anticipated that the balance of Parcel 48A will be used for parking accessory and ancillary to the Project;

WHEREAS, the BRA is cognizant of Chapter 781 of the Acts and Resolves of 1972 with respect to minimizing and preventing damage to the environment.

NOW, THEREFORE, BE IT RESOLVED BY THE BOSTON REDEVELOPMENT AUTHORITY:

That pursuant to Section 1201 thereof, the South End Urban Renewal Plan, Mass. R-56, as amended (the "Plan") be, and hereby is, further amended as follows:

1. For the purposes of the Plan, Parcel 46B shall be deemed to consist of Parcel H, Parcel J-1, Parcel M and Parcel K all as shown on the plan entitled "Land

Acquisition Plan Phase I in Boston, Mass. (South End District)" prepared by Bryant Associates, Inc. dated October, 1991, a copy of which is attached hereto as Exhibit A (the "Acquisition Plan"); and Map 1 entitled "Property Map," Map 3 entitled "Reuse Parcels," and Map 5 entitled "Proposed Rights of Way" of the Plan are hereby modified so as to be consistent therewith.

2. If and when the portion of Parcel 46B shown as Parcel M on the Acquisition Plan is transferred to the owner of Parcel 48A, said Parcel M shall thereupon be deemed deleted from Parcel 46B and shall become part of Parcel 48A for the purposes of the Plan, and Map 3 entitled "Reuse Parcels" shall thereupon be modified so as to be consistent therewith.

3. The Permitted Land Uses specified in Chapter VI, Section 602, Table A for Parcel 46B as "institutional" shall be deemed to include, without limitation, office, retail, commercial, hotel and parking uses.

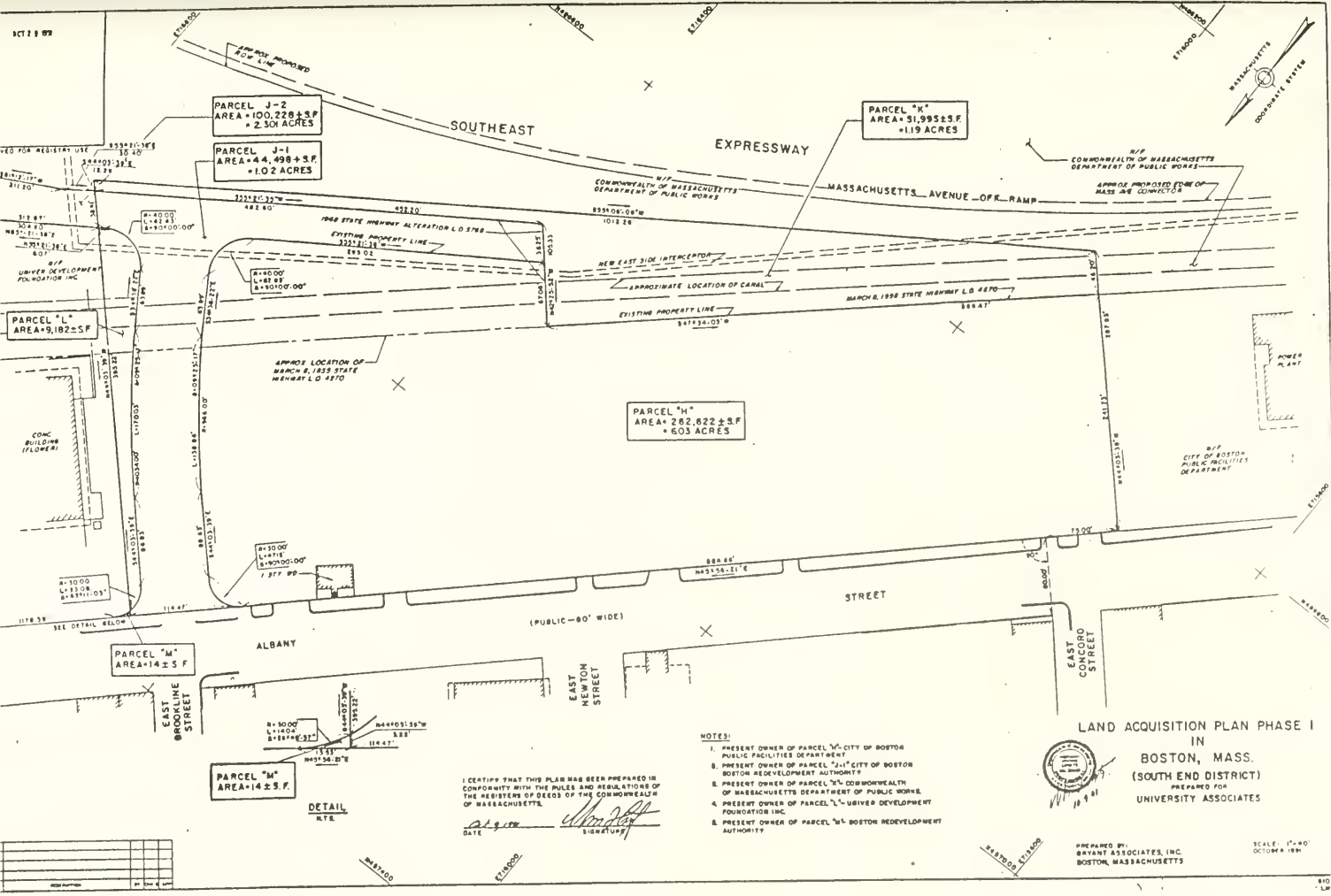
4. The Permitted Land Uses specified in Chapter VI, Section 602, Table A for Parcel 48A as "light industrial" shall be deemed to permit expressly the demolition of the existing building on Parcel 48A and the use of Parcel 48A for surface parking.

5. The term "Boston Zoning Code" as used in the Plan shall be deemed to mean and refer to the Boston Zoning Code, as amended, from time to time.

That such modifications are found to be minor modifications which do not substantially or materially alter or change the plan.

That all other provisions of said Plan not inconsistent herewith be and are continuing in full force and effect.

That the Director be, and hereby is, authorized to proclaim by certificate these minor modifications of the Plan, all in accordance with the provisions of the Urban Renewal Handbook, RHM7207.1, Circular dated June 3, 1970.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DETAIL
NTS
NOTES:
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2. PRESENT OWNER OF PARCEL "J-1" CITY OF BOSTON BOSTON REDEVELOPMENT AUTHORITY
3. PRESENT OWNER OF PARCEL "K" COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
4. PRESENT OWNER OF PARCEL "L" UNIVER DEVELOPMENT FOUNDATION INC.
5. PRESENT OWNER OF PARCEL "H" BOSTON REDEVELOPMENT AUTHORITY
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DATE
SIGNATURE
LAND ACQUISITION PLAN PHASE I
IN
BOSTON, MASS.
(SOUTH END DISTRICT)
PREPARED FOR
UNIVERSITY ASSOCIATES
PREPARED BY:
BRYANT ASSOCIATES, INC.
BOSTON, MASSACHUSETTS
SCALE: 1" = 40'
OCTOBER 1970

EXHIBIT A

MEMORANDUM OCTOBER 31, 1991

TO: BOSTON REDEVELOPMENT AUTHORITY AND
STEPHEN COYLE, DIRECTOR

FROM: LINDA MONGELLI-HAAR, ASSISTANT DIRECTOR FOR
NEIGHBORHOOD PLANNING AND ZONING
THOMAS O'MALLEY, ASSISTANT DIRECTOR FOR
NEIGHBORHOOD HOUSING AND DEVELOPMENT
GERRY KAVANAUGH, DIRECTOR OF INSTITUTIONAL PLANNING
MICHAEL HUNTER, DEPUTY DIRECTOR FOR NEIGHBORHOOD
PLANNING AND ZONING

SUBJECT: SOUTH END TECHNOLOGY SQUARE PROJECT IN THE SOUTH END URBAN RENEWAL AREA, PROJECT MASS. R-56, ADOPTION OF ORDERS OF TAKING FOR PORTIONS OF PARCEL 46B OF THE SOUTH END URBAN RENEWAL AREA.

EXECUTIVE SUMMARY: This memorandum requests that the Boston Redevelopment Authority: (1) adopt an Order of Taking for the portion of Parcel 46B owned by the City of Boston, and (2) adopt a confirmatory Order of Taking for portions of Parcel 46B owned by the Authority for title perfection purposes.

On September 26, 1991, the Boston Redevelopment Authority ("BRA") approved a Planned Development Area Master Plan and Development Impact Project Plan (the "Master Plan PDA") and two PDA development plans submitted by University Associates Limited Partnership ("UALP") for the development of a multi-use medical, research, office retail, commercial, garage and hotel project (the "Project") on Parcel 46B in the South End Urban Renewal Area, Mass. Project R-56.

UALP is seeking final designation as redeveloper of Parcel 46B under the South End Urban Renewal Plan and designation as developer of Parcel 46B and certain property adjacent thereto under M.G.L. Chapter 30B. UALP is also requesting the BRA to execute a Land Disposition Agreement for the conveyance of Parcel 46B based upon terms and conditions therefor which were negotiated with the Public Facilities Department on behalf of itself and the BRA and are set forth in a Memorandum from the Public Facilities Department ("PFD") to the Public Facilities Commission dated October 25, 1991 Re: Terms and Conditions for the Conveyance of Parcel 46B.

Parcel 46B in the South End Urban Renewal Area consists of approximately 8.5 acres of land located between Albany Street and the Massachusetts Avenue Connector, and between 600 Albany Street, one of the flower market buildings, and the power generation plant of Boston City Hospital. It is currently divided into three ownership parcels: Parcel J-1 and Parcel M consisting of approximately 1.02 acres owned by the BRA (the "BRA Parcel"), Parcel H consisting of approximately 6.03 acres owned by the City (the "City Parcel"), and Parcel K consisting of approximately 1.19 acres owned by the Commonwealth of Massachusetts (the "State Parcel"), all as shown on the plan entitled: "Land Acquisition Plan Phase I in Boston, Mass. (South End District)," dated October, 1991 prepared by Bryant Associates, Inc., a copy of which is attached hereto as Exhibit B. The Terms and Conditions contemplate that the BRA will acquire the City Parcel by exercise of the BRA's Power of Eminent Domain, perfect the title in the BRA Parcel by a confirmatory taking, then convey both the City Parcel and the BRA Parcel to UALP for the consideration provided for in the Terms and Conditions.

It is contemplated that the State Parcel would be transferred by the Commonwealth of Massachusetts to the City, by the City to the BRA, then by the BRA to UALP pursuant to Chapter 762 of the Acts of 1962, as amended by Chapter 567 of the Acts of 1966 (the "Statute"). This transfer may occur subsequent to the initial transfer of the City Parcel and BRA Parcel to UALP.

An appraisal of Parcel 46B was prepared and the damages to be awarded to the City of Boston ("City") for the contemplated acquisition of the City Parcel by exercise of the BRA's Power of Eminent Domain are specified in the Terms and Conditions. Such damages are consistent with that appraisal and are acceptable to the City.

The requested taking of the BRA Parcels is for title perfection purposes only and does not involve the acquisition of any additional land or the award of any additional damages.

The Terms and Conditions contemplate that no taking of the City Parcels will occur unless and until HUD, HHS and the Bond Trustee (as such terms are defined in the bond documents for the revenue bond for the new Inpatient Care Facility at Boston City Hospital) have released the HUD mortgage currently encumbering a portion of the City Parcel or have determined that no such release is required. Accordingly, it is recommended that both of the requested Orders of Taking be adopted, but not recorded and held in escrow until such release or determination has occurred.

An appropriate vote follows:

VOTED: That the Boston Redevelopment Authority ("BRA") adopt the Order of Taking attached hereto as Exhibit B for the portion of Parcel 46B in the

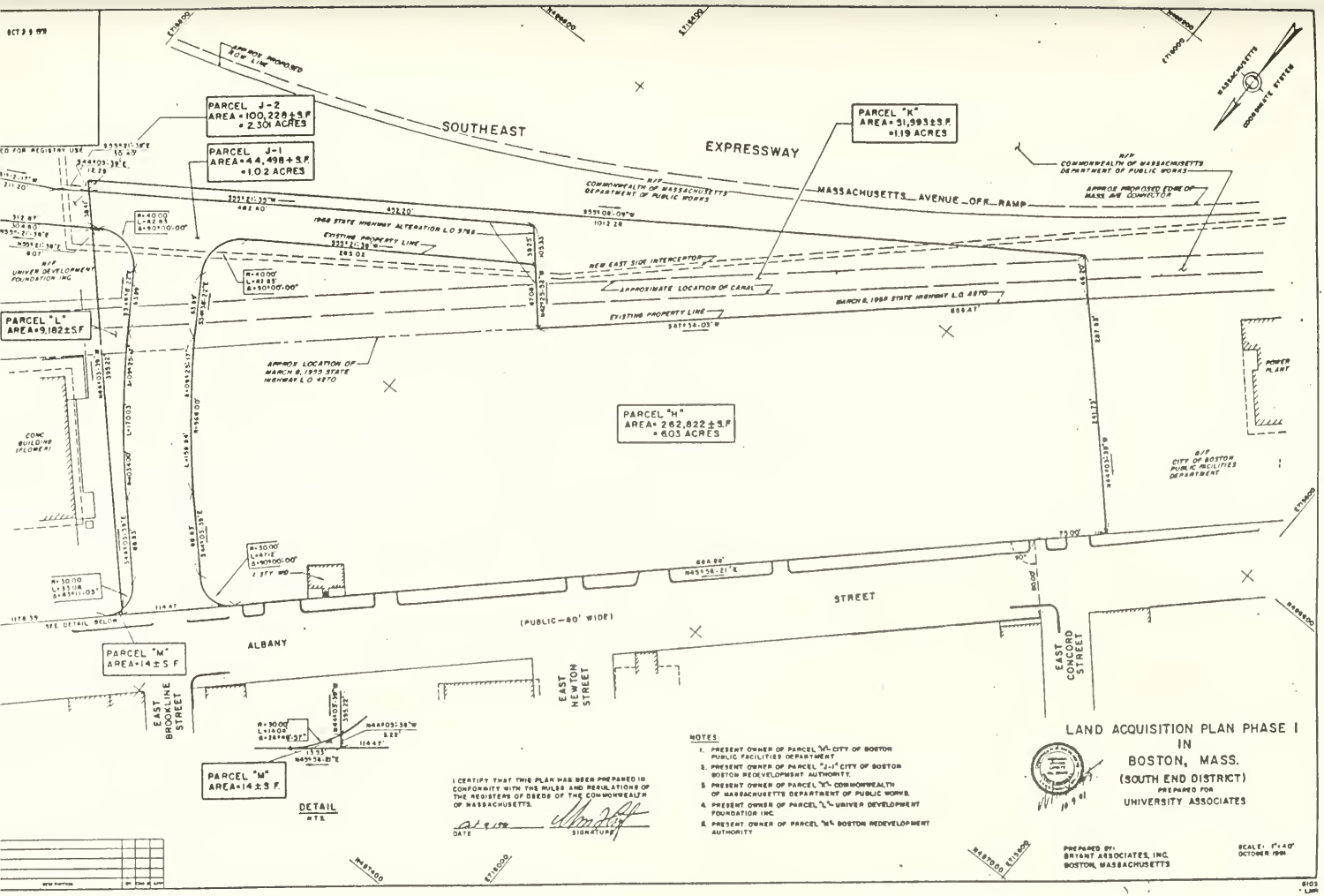
South End Urban Renewal Area consisting of Parcel H as shown on the plan entitled: "Land Acquisition Plan Phase I in Boston, Mass. (South End District)," dated October, 1991 prepared by Bryant Associates, Inc., a copy of which is attached hereto as Exhibit A.

FURTHER VOTED: That the Boston Redevelopment Authority adopt the Order of Taking attached hereto as Exhibit C for the portion of Parcel 46B in the South End Urban Renewal Area consisting of Parcel J-1 and Parcel M as shown on the plan entitled: "Land Acquisition Plan Phase I in Boston, Mass. (South End District)," dated October, 1991 prepared by Bryant Associates, Inc., a copy of which is attached hereto as Exhibit A.

FURTHER VOTED: That both of such Orders of Taking shall be held in escrow and not recorded in the Suffolk Registry of Deeds after their adoption by the BRA until such time as the mortgage currently encumbering a portion of said Parcel H as security for the revenue bond for the new Inpatient Care Facility at Boston City Hospital shall have been released or it shall have been determined that no such release is required; provided that if such Orders of Taking have not been recorded on or before the thirtieth (30th) day after the adoption thereof, the BRA shall adopt new Orders of Taking in the same form but updated to such thirtieth (30th) day, which shall replace those then held in escrow, and the same process shall be implemented every thirty (30) days to ensure the validity of said Orders of Taking under M.G.L. Chapter 79, Section 3 at the time when they are released from escrow and recorded in accordance herewith.

LIST OF EXHIBITS

Exhibit A	Land Acquisition Plan Phase I
Exhibit B	Order of Taking For Parcel H
Exhibit C	Order of Taking for Parcel J-1 and Parcel M



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AREA = 44,498 ± S.F.
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AREA = 51,993 ± S.F.
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AREA = 262,822 ± S.F.
= 6.03 ACRES
PARCEL "M"
AREA = 14 ± S.F.
PARCEL "M"
AREA = 14 ± S.F.
N/F COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS
N/F UNIVER DEVELOPMENT FOUNDATION INC
N/F CITY OF BOSTON PUBLIC FACILITIES DEPARTMENT
1968 STATE HIGHWAY ALTERATION L.O. 5768
EXISTING PROPERTY LINE
NEW EAST SIDE INTERCEPTOR
APPROXIMATE LOCATION OF CANAL
MARCH 8, 1968 STATE HIGHWAY L.O. 4870
APPROX LOCATION OF MARCH 8, 1955 STATE HIGHWAY L.O. 4870
APPROX PROPOSED ROW LINE
APPROX PROPOSED EDGE OF MASS AVE CONNECTOR
POWER PLANT
CONC BUILDING (FLOWER)
ALBANY
STREET
(PUBLIC—80' WIDE)
EAST BROOKLINE STREET
EAST NEWTON STREET
EAST CONCORD STREET
SEE DETAIL BELOW
DETAIL
NTS
MASSACHUSETTS
COORDINATE SYSTEM
NOTES:
1. PRESENT OWNER OF PARCEL "H" - CITY OF BOSTON PUBLIC FACILITIES DEPARTMENT
2. PRESENT OWNER OF PARCEL "J-1" CITY OF BOSTON BOSTON REDEVELOPMENT AUTHORITY.
3. PRESENT OWNER OF PARCEL "K" - COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS.
4. PRESENT OWNER OF PARCEL "L" - UNIVER DEVELOPMENT FOUNDATION INC.
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PREPARED BY:
BRYANT ASSOCIATES, INC.
BOSTON, MASSACHUSETTS
SCALE: 1" = 40'
OCTOBER 1961

EXHIBIT A

EXHIBIT B

COMMONWEALTH OF MASSACHUSETTS

SUFFOLK, ss

RESOLUTION

BE IT RESOLVED by the Boston Redevelopment Authority that an Order of Taking dated October ___, 1991 relating to a portion of the SOUTH END URBAN RENEWAL AREA, MASS. R-56, be executed together with a plan entitled: "Land Acquisition Plan Phase I in Boston, Mass. (South End District)," dated October, 1991 prepared by Bryant Associates, Inc., Boston, Massachusetts and made a permanent part of these proceedings, copies of which the Secretary shall cause to be recorded in the Office of the Registry of Deeds for the County of Suffolk.

A true copy.

CERTIFICATE

I hereby certify that the following names constitute the entire membership of the Boston Redevelopment Authority:

Clarence J. Jones
Michael F. Donlan
Frances X. O'Brien
James K. Flaherty
Consuelo Gonzales Thornell

A true copy.

Attest:_____
Secretary of the
Boston Redevelopment Authority

COMMONWEALTH OF MASSACHUSETTS

SUFFOLK, SS

BOSTON REDEVELOPMENT AUTHORITY

ORDER OF TAKING

WHEREAS, the Boston Redevelopment Authority, in accordance with G.L. c. 121B and its predecessor Statute G.L. c. 121, adopted and filed in the Suffolk County Registry of Deeds, Book 80567, Page 295, an ORDER OF TAKING, dated June 30, 1966, concerning and describing the SOUTH END URBAN RENEWAL AREA, all of the findings, determinations and descriptions set forth therein being incorporated herein by reference and made a part hereof; and

WHEREAS, the Boston Redevelopment Authority has deposited with the Mayor of the City of Boston security to his satisfaction for the payment of such damages as may be awarded in accordance with law to the owner or owners of said area, as required by G.L. c. 79, s. 40.

NOW.,THEREFORE, BE IT ORDERED that the Boston Redevelopment Authority, acting under the provision of said c. 121B and all other authority thereunto enabling and pursuant the applicable provisions of said c. 79, and of any and every power and authority to it, granted or implied, hereby takes for itself in fee simple by eminent domain, for the purposes hereinbefore set forth or referred to, the area or areas located in the City of

Boston as hereinafter described in ANNEX A, together with any and all easements and rights appurtenant hereto, including the trees, buildings and other structures standing upon or affixed thereto, and including the fee, if any, in all public streets, highways and public ways in said area or areas or contiguous and adjacent to the property taken hereby, provided such fee is a part of said property, except any and all easements.

AND FURTHER ORDERED that in accordance with the provisions of said c. 79, as amended, awards are made by the Boston Redevelopment Authority of damages sustained by the owner or owners and all other persons, including all mortgages of record, having any and all interest in each parcel described in ANNEX A and entitled to any damages by reason of the taking hereby made. The Boston Redevelopment Authority reserves the rights to amend the award at any time prior to the payment thereof by reason of a change in ownership of value of said property before the right to damages therefor has become vested or for other good cause shown. The awards hereby made are set forth in ANNEX B, which ANNEX B is not to be recorded in the Registry of Deeds with the order of Taking,

AND FURTHER ORDERED that the Secretary of the Boston Redevelopment Authority cause this instrument of Taking to be recorded in the Suffolk County Registry of Deeds.

IN WITNESS WHEREOF, we, the following members of the Boston Redevelopment Authority have caused the corporate seal of the Authority to be hereto affixed and these presents to be signed in the name and behalf of the Boston Redevelopment Authority.

DATED: BOSTON REDEVELOPMENT AUTHORITY

By: _____

_____

_____

_____

_____

ATTEST:

_____
Secretary of the
Boston Redevelopment Authority

ANNEX A

BOSTON REDEVELOPMENT AUTHORITY

SOUTH END URBAN RENEWAL AREA

TAKING AREA DESCRIPTION

The following parcel of land are taken by this Order of Taking:

Boston Redevelopment Authority Disposition Parcel H, containing approximately 262,622 square feet of land, shown on a plan entitled: "Land Acquisition Plan Phase I in Boston, Mass. (South End District)," dated October, 1991 prepared by Bryant Associates, Inc., Boston, Massachusetts, which Plan is recorded herewith.

The Supposed Owner of the above parcel is the City of Boston.

ANNEX B

BOSTON REDEVELOPMENT AUTHORITY

SOUTH END URBAN RENEWAL AREA

AWARD OF DAMAGES

[To be completed by the BRA]

EXHIBIT C

COMMONWEALTH OF MASSACHUSETTS

SUFFOLK, ss

RESOLUTION

BE IT RESOLVED by the Boston Redevelopment Authority that an Order of Taking dated October ___, 1991 relating to a portion of the SOUTH END URBAN RENEWAL AREA, MASS. R-56, be executed together with a plan entitled: "Land Acquisition Plan Phase I in Boston, Mass. (South End District)," dated October, 1991 prepared by Bryant Associates, Inc., Boston, Massachusetts and made a permanent part of these proceedings, copies of which the Secretary shall cause to be recorded in the Office of the Registry of Deeds for the County of Suffolk.

A true copy.

CERTIFICATE

I hereby certify that the following names constitute the entire membership of the Boston Redevelopment Authority:

Clarence J. Jones
Michael F. Donlan
Frances X. O'Brien
James K. Flaherty
Consuelo Gonzales Thornell

A true copy.

Attest: _____
Secretary of the
Boston Redevelopment Authority

COMMONWEALTH OF MASSACHUSETTS

SUFFOLK, SS

BOSTON REDEVELOPMENT AUTHORITY

ORDER OF TAKING

WHEREAS, the Boston Redevelopment Authority, in accordance with G.L. c. 121B and its predecessor Statute G.L. c. 121, adopted and filed in the Suffolk County Registry of Deeds, Book 80567, Page 295, an ORDER OF TAKING, dated June 30, 1966, concerning and describing the SOUTH END URBAN RENEWAL AREA, all of the findings, determinations and descriptions set forth therein being incorporated herein by reference and made a part hereof; and

WHEREAS, the Boston Redevelopment Authority has deposited with the Mayor of the City of Boston security to his satisfaction for the payment of such damages as may be awarded in accordance with law to the owner or owners of said area, as required by G.L. c. 79, s. 40.

NOW.,THEREFORE, BE IT ORDERED that the Boston Redevelopment Authority, acting under the provision of said c. 121B and all other authority thereunto enabling and pursuant the applicable provisions of said c. 79, and of any and every power and authority to it, granted or implied, hereby takes for itself in fee simple by eminent domain, for the purposes hereinbefore set forth or referred to, the area or areas located in the City of

Boston as hereinafter described in ANNEX A, together with any and all easements and rights appurtenant hereto, including the trees, buildings and other structures standing upon or affixed thereto, and including the fee, if any, in all public streets, highways and public ways in said area or areas or contiguous and adjacent to the property taken hereby, provided such fee is a part of said property, except any and all easements.

AND FURTHER ORDERED that in accordance with the provisions of said c. 79, as amended, awards are made by the Boston Redevelopment Authority of damages sustained by the owner or owners and all other persons, including all mortgages of record, having any and all interest in each parcel described in ANNEX A and entitled to any damages by reason of the taking hereby made. The Boston Redevelopment Authority reserves the rights to amend the award at any time prior to the payment thereof by reason of a change in ownership of value of said property before the right to damages therefor has become vested or for other good cause shown. The awards hereby made are set forth in ANNEX B, which ANNEX B is not to be recorded in the Registry of Deeds with the order of Taking,

AND FURTHER ORDERED that the Secretary of the Boston Redevelopment Authority cause this instrument of Taking to be recorded in the Suffolk County Registry of Deeds.

IN WITNESS WHEREOF, we, the following members of the Boston Redevelopment Authority have caused the corporate seal of the Authority to be hereto affixed and these presents to be signed in the name and behalf of the Boston Redevelopment Authority.

DATED: BOSTON REDEVELOPMENT AUTHORITY

By: _____

_____

_____

_____

_____

ATTEST:

_____
Secretary of the
Boston Redevelopment Authority

ANNEX A

BOSTON REDEVELOPMENT AUTHORITY

SOUTH END URBAN RENEWAL AREA

TAKING AREA DESCRIPTION

The following parcel of land are taken by this Order of Taking:

Parcel J-1, containing approximately 44,498 square feet of land, as shown on a plan entitled: "Land Acquisition Plan Phase I in Boston, Mass. (South End District)," dated October, 1991 prepared by Bryant Associates, Inc., Boston, Massachusetts, which Plan is recorded herewith.

Parcel M, containing approximately 14 square feet of land, as shown on the above-referenced plan.

The Supposed Owners of the above parcels are unknown.

ANNEX B

BOSTON REDEVELOPMENT AUTHORITY

SOUTH END URBAN RENEWAL AREA

AWARD OF DAMAGES

No awards are made with this Order of Taking.

Development Impact Project Agreement for Jobs Contribution

Transportaion Access Plan Agreement

Cooperative Agreement

DEVELOPMENT IMPACT PROJECT AGREEMENT
INCLUDING PROVISIONS FOR THE JOBS CONTRIBUTION GRANT
FOR
PLANNED DEVELOPMENT AREA NO. __
SOUTH END TECHNOLOGY SQUARE

THIS AGREEMENT ("Agreement") is made as of September __, 1991 by and between the BOSTON REDEVELOPMENT AUTHORITY (hereinafter "Authority"), a body politic and corporate created pursuant to Chapter 652 of the Acts of 1960, as amended, and UNIVERSITY ASSOCIATES LIMITED PARTNERSHIP, a Massachusetts limited partnership, the general partners of which are Univer Development Foundation, Inc., a Massachusetts non-profit corporation, and the Trustees of Boston University, a Massachusetts non-profit, educational corporation, its successors and assigns (hereinafter "Applicant"); the Authority and Applicant, collectively, shall be referred to herein as the parties.

WITNESSETH:

WHEREAS, the Applicant wishes to undertake the development of an approximately 8.5 acre site at 624-710 Albany Street (Urban Renewal Parcel 46B) in the City of Boston (hereinafter the "Site"), as more particularly described in Exhibit A attached hereto;

WHEREAS, the Applicant and the Authority have entered into a Cooperation Agreement of even date herewith (the "Cooperation Agreement") which contemplates the execution of this Agreement (undefined capitalized terms and phrases used herein shall be as defined in the Cooperation Agreement, unless otherwise indicated).

WHEREAS, the Applicant has requested from the Authority approval of the Master Plan for Planned Development Area No. __ pursuant to Section 3-1A of the Boston Zoning Code, and the Development Impact Project Plan pursuant to Articles 26 and 26B of the Zoning Code, for the development of the Site (hereinafter the "Master PDA/DIP Plan");

WHEREAS, the Applicant proposes to construct on the Site a mixed-use development (the "Project"), including one or more of the uses set forth in the Master PDA/DIP Plan in two or more phases, the Project to consist of (a) the construction of a parking garage and up to five multi-story buildings (respectively a "Component"), each to be constructed on one of the subparcels within the Site as shown as Parcels A through F (each, a "Parcel") on the plan entitled "University Associates Development Plan in Boston, Mass. (South End District)," prepared by Bryant Associates, Inc., dated May 2, 1991, revised August 5, 1991, scale 1" = 40', a copy of which is included in the development plans attached as Exhibit B to the Master PDA/DIP Plan, Parcels A and B of which are more particularly described in Exhibit B attached hereto;

WHEREAS, desiring to proceed with the development of one of the building Components of the Project on Parcel B of the Site (the "Center"), the Applicant submitted to the Authority a development plan therefor (the "Center Development Plan") pursuant to Section 3-1A of the Zoning Code entitled "Development Plan for the Center For Advanced Biomedical Research within Planned

Development Area No. __";

WHEREAS, desiring to proceed with the development of the garage Component of the Project on Parcel A (the "Garage"), the Applicant submitted to the Authority a development plan therefor (the "Garage Development Plan") pursuant to Section 3-1A of the Zoning Code entitled the "Development Plan for Technology Square Garage within Planned Development Area No. __";

WHEREAS, the parties are entering into this Agreement prior to any action by the Boston Zoning Commission to change the zoning of the Site from H-3 and M-2 subdistricts to a B-4-D subdistrict and prior to any action by the Board of Appeal of the City of Boston to grant any exceptions from the Zoning Code, all as contemplated by the Master PDA/DIP Plan and the Cooperation Agreement;

WHEREAS, the Master PDA/DIP Plan, the Garage Development Plan and the Center Development Plan were approved by the Authority on September __, 1991 (the "Vote"), after a public hearing at its meeting held on September __, 1991, notice of which was published in The Boston Herald on September __, 1991, a certified copy of which Vote is attached hereto as Exhibit C.

WHEREAS, the Applicant recognizes that the construction of the Project may have an indirect impact on the costs of housing in the City of Boston (the "City");

WHEREAS, the Applicant recognizes that the construction of the Project may result in the creation of new jobs, which in turn may require the creation of new job training programs or the

expansion of existing programs;

WHEREAS, the Project constitutes a Development Impact Project as defined in Section 26-2(1) of Article 26, of the Boston Zoning Code and Section 26B-2(1) of Article 26B of the Boston Zoning Code;

WHEREAS, the Neighborhood Housing Trust (the "Neighborhood Housing Trust") as referred to in Article 26 of the Boston Zoning Code has been created by Declaration of Trust dated November 19, 1985 pursuant to an Ordinance Establishing The Neighborhood Housing Trust passed by the City Council on May 21, 1986 and approved by the Mayor on July 6, 1986; and

WHEREAS, the Neighborhood Jobs Trust (the "Neighborhood Jobs Trust") as referred to in Article 26B of the Boston Zoning Code has been created by Declaration of Trust pursuant to an Ordinance Establishing The Neighborhood Jobs Trust passed by the City Council on August 19, 1987 and approved by the Mayor on September 8, 1987.

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained, the parties hereto agree as follows:

ARTICLE 1. MASTER PDA/DIP PLAN, DEVELOPMENT IMPACT PROJECT PLAN AND DEVELOPMENT PLANS

1.1 Master PDA/DIP Plan, Development Impact Project Plan and Development Plans. The parties hereby acknowledge that the Applicant submitted to the Authority the Master PDA/DIP Plan, the Center Development Plan and the Garage Development Plan, copies of

which are attached hereto as Exhibits D, E and F, respectively, and hereby incorporated by reference, that the Master PDA/DIP Plan includes a Development Impact Project Plan as required by Section 26-3 of Article 26 and Section 26B-3 of Article 26B of the Boston Zoning Code and that after a public hearing held on September __, 1991, notice of which was published in The Boston Herald on September __, 1991, the Authority approved the Master PDA/DIP Plan, the Center Development Plan and the Garage Development Plan on September __, 1991 pursuant to and in accordance with the Boston Zoning Code.

ARTICLE 2. LINKAGE PAYMENT

2.1 Linkage Payment. The Applicant shall be responsible, in accordance with and subject to the terms of this Agreement, for a Development Impact Project Contribution (hereinafter "Linkage Payment") as such term is defined in Section 26-2(3) of Article 26 of the Boston Zoning Code, for each Component of the Project in the amount as calculated and set forth in Section 2.5 of this Agreement. The Applicant may, at its option, satisfy its obligation for the Linkage Payment, in whole or in part, by contributing to the creation of housing units for occupancy exclusively by low and moderate income residents of the City of Boston, as described in Section 2.2 of this Agreement (hereinafter "Housing Creation Option"), or by payments made in accordance with Section 2.3 of this Agreement (hereinafter "Housing Payment Option") or by a combination of both the Housing Creation Option

and the Housing Payment Option, as described in Section 2.4 of this Agreement.

2.2 Housing Creation Option. Subject to the approval of the Neighborhood Housing Trust and the Authority, the Applicant may, in lieu of and not in addition to the Linkage Payment for any Component, elect to create or contribute to the creation of housing units for occupancy exclusively by low and moderate income residents of the City, at a cost equal to the amount of the Linkage Payment for such Component, pursuant to the Authority's Housing Creation Regulations adopted by the Authority pursuant to Section 26-2.3(a) of Article 26 of the Boston Zoning Code, by submitting, on or before the due date of the first installment of the Linkage Payment (the "Proposal Date"), a proposal in writing to the Authority describing the number, location, cost and design of such housing units. Such proposal, if approved in accordance with the Authority's Housing Creation Regulations adopted by the Authority pursuant to Section 26-2.3(a) of Article 26 of the Boston Zoning Code (hereinafter "Housing Creation Regulations"), shall satisfy the provisions of Section 26-2.3(a) of Article 26 of the Boston Zoning Code. If the Applicant elects the Housing Creation Option, the Applicant shall comply with the Housing Creation Regulations with respect thereto. The proposal shall be subject to the approval of the Neighborhood Housing Trust and the Authority after public notice and hearing.

2.3 Housing Payment Option. Subject to the approval of the Neighborhood Housing Trust and the Authority, the Applicant may

elect to create or contribute to the creation of housing units for occupancy exclusively by low and moderate income residents of the City pursuant to the Authority's Housing Creation Regulations by the contribution to the Neighborhood Housing Trust of a Linkage Payment with respect to each Component. The Linkage Payment for each Component shall be payable to the Neighborhood Housing Trust in twelve (12) equal annual installments, the first installment due upon the earlier of (a) the issuance of a certificate of occupancy for such Component's building, and (b) twenty-four (24) months after the granting of a building permit for such Component. The remaining eleven (11) payments shall be due and payable to the Neighborhood Housing Trust annually on the anniversary of the first payment. In the event that the Linkage Payment is paid for any Component as set forth in the preceding sentence, the Applicant shall provide for the benefit of the Neighborhood Housing Trust one or more letters of credit in the aggregate amount of eleven-twelfths (11/12) of the amount of the Linkage Payment for such Component. Such letter or letters of credit for any Component shall be assignable and shall be provided to the Neighborhood Housing Trust within thirty (30) after the initial payment for such Component. The Applicant may provide such letter or letters of credit having expiration dates earlier than the expiration of the eleven-year period during which subsequent installments of the Linkage Payment are required in accordance herewith, provided that such letter or letters of credit authorizes the Neighborhood Housing Trust to draw upon it (or

them) if not replaced at least thirty (30) days prior to its (or their) expiration date. The principal amount of such letter or letters of credit for any Component may be reduced by the Applicant after payment by the Applicant of any installment of the Linkage Payment for such Component, such principal reduction to be in an amount equal to the payment then made by the Applicant. The Authority will take all steps necessary to enable the Applicant to implement such reduction, including providing its written consent to any amendment to such letter or letters of credit, if required by the issuer thereof, or the exchange of the letter or letters of credit held by the Authority for one or more substitute letters of credit having the reduced principal amount. The reasonable cost of obtaining such letter or letters of credit for each Component shall be credited against the Applicant's Linkage Payment for such Component, subject to obtaining the approval of the Neighborhood Housing Trust and the Authority.

2.4 Conversion to Housing Creation Option After Proposal Date. If, after the Proposal Date for any Component, the Applicant shall desire to elect the Housing Creation Option for any Component, the Applicant shall submit a proposal for the Housing Creation Option in writing to the Authority. Such proposal, if approved by the Neighborhood Housing Trust and the Authority and performed by the Applicant, shall satisfy the obligation of the Applicant to make any payment under the Housing Payment Option subject to the Housing Creation Option and shall satisfy the provisions of Article 26 of the Boston Zoning Code for

such Component.

2.5 Calculation of Linkage Payment. The parties hereby acknowledge that the Project includes six (6) Components which will be developed in phases. Some or all of the Components will include certain uses enumerated in Table D of Article 26 of the Boston Zoning Code as in existence on the date hereof (hereinafter "Table D Uses"), as more particularly set forth in the Master PDA/DIP Plan. None of the uses enumerated shall be considered manufacturing uses as that term is defined in Article 26 of the Boston Zoning Code for purposes of calculating the Applicant's linkage obligations. The calculation of Linkage Payments for each Component in the Project shall be made independently of the calculation of Linkage Payments for each of the other Components, except that there shall be only one 100,000 square foot exemption (the "Exemption") for Table D Uses in the entire Project as a whole (as opposed to one for each Component) under Section 26-3(2)(a). The parties have agreed that the Exemption will be allocated 50% to the Center on Parcel B and 50% to the Medical Arts Building on Parcel C. While it is anticipated that the gross floor area (calculated pursuant to Section 2-1(21) of the Boston Zoning Code) of each Component devoted to one or more Table D uses in the aggregate will exceed the portion (if any) of the Exemption allocated to such Component (such excess being called the "Linkage Components"), Linkage Payments shall be required only in connection with Linkage Components and not in connection with any other improvements or any uses other than Table D Uses on the

Site. The amount of Linkage Payments for each Component referred to in Section 2.1 of this Agreement shall equal $5.00 for each square foot of gross floor area of such Component devoted to one or more Table D Uses in excess of the portion (if any) of the Exemption allocated to such Component. The gross floor area devoted to Table D Uses shall be calculated and certified by the Project Architect (as identified in the Master PDA/DIP Plan) for each Component in accordance with Section 2-1(21) of the Boston Zoning Code. In calculating the amount of Linkage Payments, below-grade, above-grade and structured parking shall not be considered "ancillary or accessory to the uses listed in Table D" within the meaning of Section 26-3(2)(a) of the Boston Zoning Code and thus shall not be included in the calculation of gross floor area subject to Linkage Payments. Based upon the foregoing, the Linkage Payment for each Component of the Project is estimated to be as follows:

Component/ Parcel	Gross Floor Area of Table D Uses	Exemption	Linkage Payment
Garage Retail Daycare Parcel A	18,800	None	$94,000
Research Center Parcel B	180,000	50,000	$650,000
Medical Arts Parcel C	160,000	50,000	$550,000
Office/Research Parcel D	140,500	None	$702,500
Office/Research Parcel E	160,000	None	$800,000
Hotel Parcel F	166,000	None	$830,000
Project	825,300	100,000	$3,626,500

The parties hereby acknowledge that the Linkage Payments estimated above are based upon the gross floor area of Table D Uses of each Component as estimated in the Mater PDA/DIP Plan. Prior to the issuance of a Certificate of Occupancy for each Component, the Applicant shall submit a statement of the final gross floor area for such Component as certified by the Applicant's architect for such Component. If the gross floor area, as defined in Section 2-1(21) of Article 2 of the Boston Zoning Code, of any Component as certified by the Applicant's architect for such Component differs from the estimates on which payments were made, the Applicant shall adjust the amount of the Linkage Payment for such Component in accordance with Article 26 of the Boston Zoning Code to reflect the change in gross floor

area of that Component.

2.6 Recalculation. The Authority hereby agrees that, subject to the final calculation provisions of Section 2.5 of this Agreement, any change in the formula (amount or rate of payment) for the calculation of the Linkage Payment as set forth in Section 26-3(2) of Article 26 of the Boston Zoning Code and otherwise, or any change in the definition of "gross floor area" in Section 2-1(21) of Article 2 of the Boston Zoning Code or other changes in the Boston Zoning Code after the date hereof, shall not in any way increase the Linkage Payment for such Component determined in accordance with Section 2.5 of this Agreement or decrease the period over which such Linkage Payments are to be made.

2.7 Notice of Linkage Payment. Upon execution of this Agreement, the Authority will notify the Trustee of the Neighborhood Housing Trust of such execution.

The Authority shall review the Applicant's determination of the final gross floor area of each Component in the Project. If the Authority confirms the Applicant's determination, it shall so certify and forward the same to the Inspectional Services Department of the City with a copy to the Trustee of the Neighborhood Housing Trust.

2.8 Project Address:

a) Project addresses as (or to be) listed on the building permit applications are:

624-710 Albany Street

b) Building application numbers are:

2.9 Non-Accrual of Linkage Payment. If a building permit is not granted for any of the Component(s) in the Project, or if construction of any of the Component(s) in the Project is abandoned after a building permit is obtained or if a building permit for any of the Component(s) in the Project is revoked or lapses and is not renewed, then the Applicant shall have no responsibility for the Linkage Payment for such Component.

2.10 Credit Towards Linkage Payment. If the City of Boston should hereafter impose, assess, or levy any excise or tax upon the Project or any Component thereof, the proceeds of which are dedicated, in whole or in part, to the establishment of a fund for the purposes substantially the same as the purposes recited in Section 26-1 of Article 26 of the Boston Zoning Code, amounts payable hereunder by Applicant for any Component in the Project shall be credited against such excise or tax; provided, however, that if such crediting shall not be legally permissible to satisfy payment of such tax or excise, the obligations of the Applicant hereunder for the Project shall, to the extent of the amount of such tax or excise, thereupon cease and be of no further force and effect.

ARTICLE 3. JOBS CONTRIBUTION GRANT

3.1 Jobs Payment. The Applicant shall be responsible, in accordance with the terms of this Agreement, for a Jobs Contribution Grant (hereinafter "Jobs Payment") as such term is defined in Section 26B-2(3) of Article 26B of the Boston Zoning

Code, in the amount as calculated in accordance with Section 3.5 hereof. The Applicant may, at its option, satisfy its obligation for the Jobs Payment, in whole or in part, by contributing to the creation of a jobs training proposal, as described in Section 3.2 of this Agreement (hereinafter, "Jobs Creation Option"), or by payment made in accordance with Section 3.3 of this Agreement (hereinafter, "Jobs Payment Option") or by a combination of both the Jobs Creation Option and the Jobs Payment Option.

3.2 Jobs Creation Option. Subject to the approval of the Neighborhood Jobs Trust and the Authority, the Applicant, in a cooperative effort with the Project Advisory Committee established for the Project, may elect to create or contribute to the creation of a jobs training program for use by low and moderate income South End residents pursuant to the Authority's Jobs Creation Regulations adopted by the Authority pursuant to Section 26B - 2.3(a) of Article 26B of the Boston Zoning Code funded by the first installment of the Jobs Payment for any Component (i.e., fifty (50%) percent of the Jobs Payment for such Component). Such election shall not, however, affect the Applicant's responsibility to pay the second installment of the Jobs Payment for such Component. If the Applicant chooses the Job Creation Option for any Component, then (a) such election may be used in conjunction with the development of a jobs training program by the Applicant and the Project Advisory Committee, and (b) in accordance with the Jobs Creation Regulations, the Applicant shall submit a proposal in writing to the Authority on or before the due date of the first

installment of the Jobs Payment for such Component (the "Jobs Proposal Date"). Such proposal, if approved in accordance with the Guide to the Neighborhood Jobs Trust dated April, 1988, shall satisfy the provisions of Section 26B-2.3(a) of Article 26B of the Boston Zoning Code with respect the first installment of the Jobs Payment for such Component. If the Applicant elects the Jobs Creation Option for any Component, the Applicant shall comply with the Jobs Creation Regulations with respect thereto. The proposal shall be subject to the approval of the Neighborhood Jobs Trust and the Authority after public notice and hearing.

3.3 Jobs Payment Option. Subject to the approval of the Neighborhood Jobs Trust and the Authority, the Applicant may elect to create or contribute to the creation of a job training program for workers who will be employed on a permanent basis at the Project pursuant to the Authority's Jobs Creation Regulations by the contribution to the Authority of a Jobs Payment for any Component of the Project calculated in accordance with Section 3.5 below, which shall be payable to the Neighborhood Jobs Trust in two (2) equal annual installments. The first installment for any Component shall be due upon the issuance of a building permit for such Component and the second installment with respect thereto shall be due on the anniversary of the first payment. Each Jobs Payment shall be made to the Collector-Treasurer of the City of Boston, Room M-5, One City Hall Square, Boston, Massachusetts, 02201, as custodian (the "Collector-Treasurer"), pending acceptance of such payments for the Neighborhood Jobs Trust by the

City. The Authority hereby agrees that delivery of such payments to the Collector-Treasurer constitutes full satisfaction of the Applicant's obligation to make such payments. In addition, the Applicant shall submit to the Neighborhood Jobs Trust, at the time that Applicant pays its first installment of Jobs Payment, a proposal for the use of the Jobs Payment to benefit the community. In the event that any Jobs Payment is paid for any Component as set forth herein, the Applicant shall provide for the benefit of the Neighborhood Jobs Trust a letter of credit in the amount of one half (1/2) of the amount of the Jobs Payment for such Component. Such letter of credit shall be assignable and shall be provided to the Neighborhood Jobs Trust within thirty (30) after the initial payment for such Component. The reasonable cost of obtaining such letter of credit for each Component shall be credited against the Applicant's Jobs Payment for such Component, subject to obtaining the approval of the Neighborhood Housing Trust and the Authority.

3.4 Conversion to Jobs Creation Option After Jobs Proposal Date. If, after the Jobs Proposal Date for any Component, the Applicant shall desire to elect the Jobs Creation Option for such Component, the Applicant shall submit a proposal for the Jobs Creation Option in writing to the Authority. Any such proposal for any Component, if approved by the Neighborhood Jobs Trust and the Authority and performed by the Applicant, shall satisfy the obligation of the Applicant to make any payment under the Jobs Payment Option subject to the Jobs Creation Option and shall

satisfy the provisions of the Jobs Contribution requirement for such Component.

3.5 Calculation of Jobs Payment. The parties hereby acknowledge that the Project includes six (6) Components which will be developed in phases. Some or all of the Components in the Project will include certain uses enumerated in Table E of Section 26B-3 of Article 26B of the Boston Zoning Code as in existence on the date hereof (hereinafter "Table E Uses"), including, without limitation, office, research and development, retail, educational, institutional, and hotel uses. The calculation of Jobs Payments for each Component in the Project shall be made independently of the calculation of Jobs Payments for each of the other Components, except that there shall be only one 100,000 square foot exemption (the "Jobs Exemption") for Table E Uses in the entire Project as a whole (as opposed to one for each Component) under Section 26B-3(1)(a). The parties have agreed that the Jobs Exemption will be allocated 50% to the Center on Parcel B and 50% to the Medical Arts Building on Parcel C. While it is anticipated that the gross floor area (calculated pursuant to Section 2-1(21) of the Boston Zoning Code) of each Component devoted to one or more Table E Uses in the aggregate will exceed the portion (if any) of the Jobs Exemption allocated to such Component (such excess being called the "Jobs Linkage Components"), Jobs Payments shall be required only in connection with Jobs Linkage Components and not in connection with any other improvements or uses other than Table E Uses on the Site. The amount of the Jobs Payment for each

Component shall equal $1.00 for each square foot of gross floor area devoted to one or more Table E Uses in excess of the portion (if any) of the Jobs Exemption allocated to such Component. The gross floor area devoted to Table E Uses shall be calculated and certified by the Applicant's architect for each Component in the Project in accordance with Section 2-1(21) of the Boston Zoning Code. In calculating the amount of Jobs Payments, below-grade, above-grade and structured parking shall not be considered "accessory to the uses listed in Table E" within the meaning of Section 26B-3(1)(a) of the Boston Zoning Code and thus shall not be included in calculation of gross square area subject to Jobs Payments. Based upon the foregoing, it is estimated that the Jobs Payment for each Component will be as follows:

Component/ Parcel	Gross Floor Area of Table E Uses	Jobs Exemption	Jobs Payment
Garage Retail/Daycare Parcel A	18,800	None	$ 18,800
Research Center Parcel B	180,000	50,000	$130,000
Medical Arts Parcel C	160,000	50,000	$110,000
Office/Research Parcel D	140,500	None	$140,500
Office/Research Parcel E	160,000	None	$160,000
Hotel Parcel F	166,000	None	$166,000
Project	825,300	100,000	$725,300

The parties hereby acknowledge that the Jobs Payments estimated above are based upon the gross floor area of Table E Uses of each Component as estimated in the Mater PDA/DIP Plan. Prior to the issuance of the Certificate of Occupancy for each Component in the Project, the Applicant shall submit a statement of the final gross floor area for such Component as certified by the Applicant's architect for such Component. If the gross floor area, as defined in Section 2-1(21) of Article 2 of the Boston Zoning Code, of such Component as certified by such architect differs from the estimates on which payments were made, the Applicant shall adjust the amount of the Jobs Payment shall in accordance with Article 26B of the Boston Zoning Code to reflect the change in the gross floor area for that Component.

3.6 Recalculation. The Authority hereby agrees that, subject to the final calculation provisions of Section 3.5 of this Agreement, any change in the formula (amount or rate of payment) for the calculation of the Jobs Payment as set forth in Section 26B-3(1) of Article 26B of the Boston Zoning Code and otherwise, or any change in the definition of "gross floor area" in Section 2-1(21) of Article 2 of the Boston Zoning Code or other changes in the Boston Zoning Code after the date hereof, shall not in any way increase the Jobs Payment determined in accordance with Section 3.5 of this Agreement or decrease the period over which Jobs Payments are to be made.

3.7 Notice of Jobs Payment. Upon execution of this Agreement the Authority will notify the Trustee of the

Neighborhood Jobs Trust of such execution.

3.8 Jobs Payment Date. The Jobs Payment Date shall be determined independently for each of the Components in the Project. The Jobs Payment for each of the Components for which Jobs Payments are due shall be made in two (2) equal annual installments. The first installment of the Jobs Payment for each Component shall be due on the date of issuance of the building permit for such Component. The remaining installment for each Component shall be due and payable without interest on the anniversary of the first payment.

3.9 Non-Accrual of Jobs Payment. If a building permit is not granted for any of the Component(s) in the Project, or if construction of any of the Component(s) in the Project is abandoned after a building permit is obtained or if a building permit for any of the Component(s) in the Project is revoked or lapses and is not renewed, then the Applicant shall have no responsibility for the Jobs Payment with respect to such Component.

3.10 Credit Toward Jobs Payment. If the City of Boston should hereafter impose, assess, or levy any excise or tax upon the Project or any Component thereof, the proceeds of which are dedicated, in whole or in part, to the establishment of a fund for the purposes substantially the same as the purposes recited in Section 26B-1 of Article 26B, amounts payable hereunder by Applicant for the Project or any Component thereof shall be credited against such excise or tax; provided, however, that if

such crediting shall not be legally permissible to satisfy payment of such tax or excise, the obligations of the Applicant hereunder shall, to the extent of the amount of such tax or excise, thereupon cease and be of no further force or effect.

ARTICLE 4. ASSIGNABILITY AND LIABILITY.

4.1 Assignability and Liability. This Agreement shall be binding upon and enforceable against the successors and assigns of the parties hereto (other than any mortgagee of any Component or anyone claiming through any such mortgagee unless such party obtains title to, and proceeds with the development of, such Component), it being understood and agreed that the Applicant shall have the right to transfer or assign to another party or parties its rights, obligations and interests under this Agreement and in all or any portion of the Site. The Authority agrees that Applicant and its successors in interest shall be liable for breaches of obligations under this Agreement with respect any Component of the Project only while it or any successor in interest, as the case may be, is owner of such Component. The Authority further agrees to look solely to Applicant's or its successors' interest in any Component and its constituent Parcel for the satisfaction of any claim arising under this Agreement with respect to such Component; provided, however, that if a letter or letters of credit shall have been provided hereunder with respect to the Linkage Payment and Jobs Payment for any Component, then the Authority shall look solely thereto for the

satisfaction of any claim under this Agreement with respect to such Component. In no event shall the Applicant or any trustee, beneficiary, partner, manager, agent, or employee thereof, or its successors in interest, ever be personally or individually liable; nor shall it or they ever be answerable or liable in any equitable proceeding or order beyond the extent of its or their interest in the Component(s) in respect of which such liability shall have arisen; provided that if any letter or letters of credit have been provided hereunder with respect to such Component recourse for such liability shall be limited thereto. It is specifically understood and agreed that Applicant shall have the right to transfer its interest in any of the Project Components to third party Component Developers, as contemplated and defined in the Cooperation Agreement, together with the Applicant's rights and obligations with respect to such Component under this Agreement. Accordingly, the Authority agrees that from and after any such transfer to a Component Developer, (a) such Component Developer shall become liable for any Linkage Payment and Jobs Payment for such Component payable from and after such Component Developer's acquisition of such Component and the Authority shall enter into a Development Impact Project Agreement with such Component Developer with respect thereto substantially in the form of this Agreement and (b) Applicant's obligations under this Agreement with respect to the Linkage Payment and Jobs Payment payable thereafter in respect of such Component shall be released, and no further liability shall accrue to Applicant hereunder with respect

thereto, from and after the date of such transfer to the Component Developer, all of which shall be confirmed in writing by the Authority, the Neighborhood Housing Trust and the Neighborhood Jobs Trust upon Applicant's request.

4.2 Default. Each and every covenant contained in this Agreement is and shall be construed to be a separate and independent covenant applicable severally to each Component of the Project, and a default with respect to a particular Component under any section or provision of this Agreement shall not constitute a default with respect to any other Component or affect the continuing validity of any variances, conditional use permits, exceptions, zoning map or text amendments, building permits, certificates of occupancy and the like for any other Component(s) or the Project as a whole.

4.3 Severability. If any term or provision of this Agreement, or the application thereof to any person or circumstance, shall to any extent be invalid and unenforceable, the remainder of this Agreement, or the application of such terms to persons or circumstances other than those to which it is invalid or unenforceable, shall not be affected thereby, and each term and provision of this Agreement shall be valid and shall be enforced to the extent permitted by law.

ARTICLE 5. MISCELLANEOUS PROVISIONS.

5.1 Amendments; Law to be Applied. If the parties hereto agree hereafter to amend this Agreement, such amendment shall be

in writing and executed by the parties hereto. This Agreement shall be governed by the laws of the Commonwealth of Massachusetts, and sets forth the entire agreement between the parties. This Agreement is binding and enforceable under contract law upon, and inures to the benefit of, the parties, their successors, assigns, and legal representatives, with respect to the Project or any Component thereof, including, without limitation, any successor owner or owners of the improvements for the Project or any part thereof, and the Neighborhood Housing Trust and the Neighborhood Jobs Trust as successors to the Authority, notwithstanding any subsequent amendment, or repeal of Article 26 or Article 26B of the Boston Zoning Code or court decision having the effect of an amendment or repeal of Article 26 or Article 26B of the Boston Zoning Code.

5.2 Capitalized Terms. The capitalized terms used herein without definition shall have the meanings ascribed in the Cooperation Agreement, or if not defined therein, in Article 2 or Article 26 or Article 26B of the Boston Zoning Code, unless otherwise provided.

5.3 Compliance with the Master PDA/DIP Plan, the Center Development Plan and the Garage Development Plan. The Authority hereby acknowledges approval of the Master PDA/DIP Plan, the Center Development Plan and the Garage Development Plan as voted by the Authority on September __, 1991. The Authority also acknowledges that, prior to approving the Master PDA/DIP Plan, the Center Development Plan and the Garage Development Plan, pursuant

to Sections 3-1A(a), 26-3.1 and 26B-3.1 of the Boston Zoning Code, the Authority found that the Master PDA/DIP Plan, the Center Development Plan and the Garage Development Plan, respectively, each conform to the general plan for the City as a whole and that nothing in the Master PDA/DIP Plan, the Center Development Plan and the Garage Development Plan will be injurious to the neighborhood or otherwise detrimental to the public welfare. The Applicant hereby agrees to proceed with the Project in accordance with the Master PDA/DIP Plan, the Center Development Plan and the Garage Development Plan subject to final design, environmental and other development review by the Authority in accordance with the Authority's Development Review Procedures dated 1985, revised 1986, in the form attached to the Cooperation Agreement.

5.4 Knowledge of Laws. Applicant shall keep itself fully informed of all votes of the Authority, City ordinances, executive orders, and regulations, and state and federal law which in any manner affect the provisions of this Agreement. Applicant shall at all times observe and comply with said votes, ordinances, executive orders, regulations or laws, and the Applicant and its successors and assigns, respectively, shall protect and indemnify the City and the Authority, its officers, agents and employees against any claim or liability arising from or based upon the violations of such ordinances, executive orders, regulations or laws in effect on the date hereof caused by any negligent act or omission of the Applicant or its successors and assigns, respectively.

5.5 Notice. All notices or other communications required or permitted to be given under this Agreement shall be in writing, signed by a duly authorized officer or representative of the Authority or the Applicant, as the case may be, and shall be either hand delivered or mailed postage pre-paid, by registered or certified mail, return receipt requested and shall be deemed given when delivered, if by hand, or when deposited with the U.S. Postal Service, if mailed to the principal office of the party to which it is directed, which is as follows unless otherwise designated by written notice to the other parties:

Applicant:	UNIVERSITY ASSOCIATES LIMITED PARTNERSHIP c/o Mr. Robert F. Walsh Walsh and Associates, Inc. 307 First Street Boston, MA 02127
with a copy to:	Rubin and Rudman 50 Rowes Wharf Boston, MA 02110 ATTN: James H. Greene
Authority:	Boston Redevelopment Authority 1 City Hall Square Boston, MA 02201 ATTN: Director
with a copy to:	Boston Redevelopment Authority 1 City Hall Square Boston, MA 02201 ATTN: Chief General Counsel

5.6 Certification of Compliance. The Authority hereby agrees to assist the Applicant in obtaining from the Collector-Treasurer, upon satisfaction by the Applicant of its obligations with respect to any Linkage Payment or Jobs Payment, or any installment thereof, within 10 business days after request by the

Applicant, a certification in recordable form, that (i) said Linkage Payment or Jobs Payment, or both, as the case may be, has been satisfied by the Applicant and that the Applicant has no further liability for such Linkage Payment or Jobs Payment, or (ii) said Linkage Payment or Jobs Payment has been paid to date.

5.7 Satisfaction of Development Impact Project Requirements. The Authority hereby acknowledges that, by executing this Agreement, the Applicant has satisfied the requirements of Section 26-3(2) of Article 26 and Section 26B-3(1) of Article 26B of the Boston Zoning Code insofar as satisfaction of the requirements of those Sections is a precondition to the granting, allowing, or adopting of variance, conditional use permits, exceptions, or zoning map or text amendments with respect to the Applicant's development of the Site. The Authority shall assist the Applicant to obtain from the Neighborhood Housing Trust and the Neighborhood Jobs Trust a written receipt for each Linkage Payment and Jobs Payment made under this Agreement, respectively. Upon payment of the last installment of the Linkage Payment or Jobs Payment for any Component, respectively, the Authority shall acknowledge in writing that all of the requirements of this Agreement and Article 26 or 26B (whichever type of payment is involved) have been fully satisfied with respect to such Component. The Authority shall similarly acknowledge in writing full performance and satisfaction of this Agreement and Article 26 of the Zoning Code with respect to any Component upon performance of the Housing Creation Option or Jobs Creation Option for any Component (if any) for which such

election shall have been made hereunder.

5.8 Certificate. The Authority shall, within ten days after written request therefor by Applicant, any (prospective) mortgagee or Component Developer of any Component(s) or any portion thereof, provide a certificate in writing, as requested or applicable, that this Agreement or any particular Section hereof specified by the requesting party is in full force and effect and unmodified, or in what respects the Agreement is no longer in force or effect or has been modified, that Applicant is in compliance with this Agreement or any particular Section hereof specified by the requesting party, or in what respects there is non-compliance, or as to any other matter reasonably related to the Project or any Component which the requesting party may reasonably request.

5.9 Titles. The captions of this Agreement, its articles and sections throughout this document are intended solely to facilitate reading and referencing its provisions. Such captions shall not affect the meaning or interpretation of this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed in their behalf by their respective officers thereunto duly authorized as of the day and year first above set forth.

Approved as to form

_____

Assistant General Counsel
Boston Redevelopment Authority

BOSTON REDEVELOPMENT AUTHORITY

By:_____
Stephen Coyle, Director
Duly Authorized

UNIVERSITY ASSOCIATES
LIMITED PARTNERSHIP

By:_____
General Partner

By:_____
Name:
Title:
Duly Authorized

LIST OF EXHIBITS
TO
DEVELOPMENT IMPACT PROJECT AGREEMENT
FOR
PLANNED DEVELOPMENT AREA NO. ___

South End Technology Square

Exhibit A	Legal Description of Premises
EXHIBIT B	Legal Description of Parcels A and B
EXHIBIT C	Certified Copy of BRA Vote
EXHIBIT D	Master PDA/DIP Plan
EXHIBIT E	Center Development Plan
EXHIBIT F	Garage Development Plan

TRANSPORTATION ACCESS PLAN AGREEMENT
BETWEEN
THE CITY OF BOSTON TRANSPORTATION DEPARTMENT
AND
(DEVELOPER)

This Agreement is entered into this _____ day of , 1991, by and between the CITY OF BOSTON TRANSPORTATION DEPARTMENT (hereinafter referred to as "BTD") and [Developer's name], a _____ with a principal place of business at (hereinafter referred to as "Developer").

WITNESSETH THAT:

WHEREAS, Developer proposes to construct [description of project]; and

WHEREAS, a Transportation Access Plan dated _____ has been submitted on behalf of the Developer which documents traffic and parking impacts of the Project, which Transportation Access Plan has been attached hereto as Exhibit A; and

WHEREAS, Developer acknowledges potential traffic and parking impacts from the construction and operation of the Project and that such impacts can be mitigated through a construction management plan and a permanent access plan; and

WHEREAS, the BTD and the Developer desire to mitigate traffic and parking impacts from the construction and operation of the Project;

NOW, THEREFORE, in consideration of the mutual promises herein contained, the sufficiency of which is hereby acknowledged, the parties do hereto mutually agree as follows:

Section 1. Definitions

(a) "Agreement" shall mean this Transportation Access Plan

Agreement.

(b) "BRA" shall mean the Boston Redevelopment Authority, a body politic and corporate, organized under Massachusetts General Laws, Chapter 121B, with offices at One City Hall Plaza, Boston, Massachusetts 02201, its successors and assigns.

(c) "BTD" shall mean the Transportation Department of the City of Boston with offices at One City Hall Plaza, Rm. 721, Boston, Massachusetts 02201, its successors and assigns.

(d) "Certificate of Occupancy" shall mean a certificate of occupancy issued by the City of Boston Inspectional Services Department for the Project.

(e) "Project" shall mean [description of the property].

(f) "Site" shall mean the square foot parcel located at [address], as more fully set forth in Exhibit B to this Agreement.

(g) "Developer" shall mean [name, type of business and address], its successors and assigns.

(h) "Effective Date" shall mean the date of issuance of the initial Certificate of Occupancy.

(i) "Term of this Agreement" shall mean the period of time from the Effective Date hereof to thirty (30) years from the date of issuance of the initial Certificate of Occupancy.

(j) "Traffic Impact and Access Plan" shall mean the Transportation Impact Study and Access Plan for the Project dated prepared for the Developer by _____, as such Plan may from time to time be amended, a copy of which is attached as Exhibit A and

incorporated herein by reference.

Section 2. Traffic Mitigation

(Measures designed to reduce the volume and impact of vehicular traffic)

Section 3. Parking

(Measures designed to improve the function of on-site parking and, for office and commercial projects, to encourage through parking management ridesharing and short-term rather than long-term use of parking spaces.)

Section 4. Transit

(Measures to encourage transit use and to mitigate project impacts on the transit system.)

Section 5. Pedestrians and Bicyclists

(Description of pedestrian amenities to be constructed, including safety features, and bicycle parking facilities.)

Section 6. Truck Deliveries

(Description of loading dock plans and restrictions on hours and location of truck deliveries.)

Section 7. Construction Management Plan

Developer shall prepare a construction management plan which details measures to insure the maintenance of existing levels of service on adjacent roadways during the construction of the Project and to minimize disruption at neighboring residential sites, and shall submit said plan to the BTD for approval. Such approval shall be obtained prior to the developer obtaining any building permit from the City of Boston Inspectional Services

Department (ISD). It is understood by the Developer that the development of a construction management plan is a precondition to the issuance of a building permit for the Project by ISD.

The construction management plan shall include, but not be limited to, measures dealing with: proposed street occupancies; use of tower cranes; sidewalk occupancies or obstruction of pedestrian flow; materials staging; transportation and parking for construction workers; hours of construction work; materials delivery.

Failure to comply with the provisions of the Construction Management Plan may result in withdrawal of the Building Permit or Street Occupancy Permit until such time as the Commissioner of Transportation determines that the Developer is in compliance with the Construction Management Plan.

Section 8. Transportation Coordinator

Developer shall designate a transportation coordinator who shall cooperate with the BTD in the execution and monitoring of the obligations set forth in this Agreement.

Section 9. Defaults and Remedies

In the event that the Developer shall fail to comply with or shall breach any provisions of this Agreement, and such failure or breach shall continue for 60 days after written notice thereof from the BTD, the BTD may institute any such actions and proceedings as the BTD may deem appropriate, including, but not limited to, an action to compel specific performance and/or to collect any and all damages, expenses, losses and costs caused by

such failure or breach, including legal expenses.

Section 10. Records and Reports

Developer shall keep and maintain books, records and other documents regarding compliance with this Agreement, and perform surveys and inspections on an annual basis regarding transportation impacts of the Project. The Developer shall make the same available at all reasonable times for inspection, copying, audit and examination by the BTD, and shall provide the BTD with an annual report that summarizes the same within sixty days of the end of each calendar year.

Section 11. Access to Project

Developer agrees that any duly authorized representative of the BTD shall, at all reasonable times, have access to any portion of the Project until the completion of the construction of the Project.

Section 12. Assumption of Liability

Developer shall assume the defense of and hold the BTD, its officers, agents or employees, harmless from all suits and claims against them or any of them arising from any act or omission of the Developer, its agents or employees in any way connected with performance under this Agreement.

Section 13. Assignment

Developer may assign its interest in this Agreement, but only subject to and by complying with the following conditions:

(1) Prior to assignment, Developer shall notify the BTD of its intention to assign and identify all prospective

assignees;

(2) At the time of the assignment, Developer shall not then be in default of the terms and conditions of this Agreement imposed upon Developer to such date;

(3) The assignee shall expressly assume and agree to perform and comply with all the covenants and provisions of this Agreement on the part of the Developer; and

(4) There shall be promptly delivered to the BTD the original or a duplicate original of the instrument or instruments containing such assignment to and assumption by the assignee.

Section 14. Waiver

No act by or on behalf of the BTD shall be, or be deemed or construed to be, any waiver of any such requirement or provision, unless the same be in writing, signed by the BTD and expressly stated to constitute such waiver. Any express waiver by the BTD of any rights, terms or conditions of this Agreement shall not operate to waive such rights, terms or conditions or any other rights, terms or conditions, beyond the specific instance of such waiver.

Section 15. Conflict of Interest

Developer covenants and agrees that it shall, in carrying out its responsibilities under this Agreement, comply strictly with each and every provision of c. 268A of the General Laws (the Conflict of Interest Law) to the full extent of the applicability of said provisions to the Developer.

Section 16. Successors and Assigns

The provisions of this Agreement shall be binding upon, and shall inure to the benefit of, the successors and assigns of the Developer (including without limitation any condominium association or other association having powers of control over the Site or any portion thereof under Chapter 183A, Massachusetts General Laws) and the public body or bodies succeeding to the interests of the BTD. Upon execution of this Agreement the Developer shall provide the BTD evidence, which is satisfactory to the BTD, of recording of the document in the Suffolk County Registry of Deeds.

Section 17. Notices

All notices or other communication required or permitted to be given under this Agreement shall be in writing, signed by a duly authorized officer of the Developer, or of the BTD, and shall be deemed delivered if mailed, postage prepaid, by registered or certified mail, return receipt requested, or delivered by hand to the principal office of the intended party, which is as follows unless otherwise designated by written notice to the other parties:

DEVELOPER:	(name and address)
BTD:	City of Boston Transportation Department One City Hall Plaza, Rm. 721 Boston, Massachusetts 02201 Attention: Commissioner
with copies to:	City of Boston Transportation Department One City Hall Plaza, Rm. 721 Boston, Massachusetts Attention: Special Assistant Corporation Counsel

City of Boston Law Department
One City Hall Plaza, Rm. 615
Boston, Massachusetts 02201
Attention: Corporation Counsel

Boston Redevelopment Authority
One City Hall Plaza
Boston, Massachusetts 02201
Attention: Director

Section 18. Amendment

This Agreement, or any part thereof, may be amended from time to time hereafter only in writing executed by BTD and the Developer.

Section 19. Future Adjustments to Plan

The provisions of this Agreement reflect the existing conditions documented in the Transportation Impact and Access Plan. If, during the five years following execution of this Agreement, these conditions have changed, the BTD in accordance with Section 17 of this Agreement, may require the Developer to make reasonable adjustments to its Transportation Impact and Access Plan to respond to these changes. Any proposal shall take due recognition of fiscal, fiduciary, regulatory or other constraints on the Developer.

If and when an organization ("Transportation Management Association" or "Transportation Management Organization") may be established among property-owners, property management companies, and/or employers in the vicinity of the Project, for the purpose of improving transportation conditions through cooperative promotion of transit and ridesharing and other means, Developer will participate fully in such organization.

Section 20. Severability

Each and every covenant and agreement contained in this Agreement is and shall be construed to be a separate and independent covenant and agreement. If any term or provision of this Agreement or the application thereof to any person or circumstance shall to any extent be invalid and unenforceable, the remainder of this Agreement or the application of such term to persons or circumstances other than those as to which it is invalid or unenforceable shall not be affected thereby, and each term and provision of this Agreement shall be valid and shall be enforced to the extent permitted by law.

Section 21. Governing Law

This Agreement shall be governed and construed in accordance with the laws of the Commonwealth of Massachusetts.

Section 22. Execution in Counterparts

This Agreement shall be executed in two counterparts. All such counterparts shall be deemed to be originals and together shall constitute but one and the same instrument.

Section 23. Effective Date

This Agreement shall be deemed to become effective as of the date it shall be executed and dated by all parties.

Section 24.. Expiration

This Agreement shall terminate thirty (30) years from the issuance of the initial Certificate of Occupancy, unless extended by agreement of the parties.

Section 25.. Mitigation Expenses

All mitigation measures undertaken pursuant to this contract shall be at the expense of the Developer and no expense will be incurred by the BTD with respect to such measures.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be signed, sealed and delivered by their respective duly authorized representatives, as of the date first written above.

WITNESS:

DEVELOPER:

By_____
(name, title)
(Authorized pursuant to the document attached hereto as Exhibit __)

Suffolk ss.

Boston, Massachusetts (date)

Then personally appeared the above named and acknowledged the foregoing document to be his/her free act and deed, before me.

_____
Notary Public
My Commission expires _____

CITY OF BOSTON TRANSPORTATION DEPARTMENT

By_____
Richard A. Dimino, Commissioner

Suffolk, ss.

Boston, Massaschusetts (date)

Then personally appeared the above named and acknowledged the foregoing document to be his/her free act and deed, before me.

_____
Notary Public
My Commission expires _____

COOPERATION AGREEMENT
FOR
PLANNED DEVELOPMENT AREA NO. 41

South End Technology Square

This AGREEMENT ("Agreement") is made as of the 26th day of September, 1991 by and between the BOSTON REDEVELOPMENT AUTHORITY, a body politic and corporate created pursuant to Chapter 652 of the Acts of 1960, as amended, acting in its capacity as the planning board for the City of Boston (the "Authority") and UNIVERSITY ASSOCIATES LIMITED PARTNERSHIP, a Massachusetts limited partnership, the general partners of which are Univer Development Foundation, Inc., a Massachusetts non-profit corporation and the Trustees of Boston University, a Massachusetts non-profit, educational corporation, its successors and assigns (the "Applicant").

WHEREAS, the Applicant wishes to undertake the development of an approximately 8.5 acre site (the "Site") at 624-710 Albany Street (Urban Renewal Parcel 46B) in the City of Boston, as more particularly described in Exhibit A attached hereto;

WHEREAS, the Applicant proposes to construct on the Site a mixed-use development (the "Project"), in two or more phases, consisting of the construction of a parking garage and up to five multi-story buildings (respectively, a "Component"), each to be constructed on one of the subparcels within the Site as shown as Parcels A through F on a plan entitled "University Associates Development Plan in Boston, Mass. (South End District)," prepared by Bryant Associates, Inc., dated May 2, 1991, revised August 5,

1991, Scale 1" = 40', a copy of which is included in the plans attached as Exhibit B to the Master Plan PDA (as defined below), Parcels A and B of which are more particularly described in Exhibit B attached hereto;

WHEREAS, the Applicant has requested that the Authority approve the Master Plan for Planned Development Area No. 41 (the "Master Plan PDA"), pursuant to Section 3-1A of the Boston Zoning Code (the "Code") and the Development Impact Project Plan, pursuant to Articles 26, 26A and 26B of the Code, for the development of the Project on the Site, a copy of which is attached hereto as Exhibit C;

WHEREAS, desiring to proceed with the development of a building (the "Center") on Parcel B of the Site, the Applicant submitted to the Authority a development plan therefor (the "Center Development Plan") pursuant to Section 3-1A of the Code entitled "Development Plan for the Center For Advanced Biomedical Research within Planned Development Area No. 41," a copy of which is attached hereto as Exhibit D;

WHEREAS, desiring to proceed with the development of a garage (the "Garage") on Parcel A of the Site, the Applicant submitted to the Authority a development plan therefor (the "Garage Development Plan") pursuant to Section 3-1A of the Code entitled the "Development Plan for Technology Square Garage within Planned Development Area No. 41," a copy of which is attached hereto as Exhibit E;

WHEREAS, the Master Plan PDA, the Garage Development Plan and

the Center Development Plan were approved by the Authority on September 26, 1991 (the "Vote"), after a public hearing at its meeting held on September 26, 1991, notice of which was given as provided by law, a certified copy of which Vote is attached hereto as Exhibit F; and

WHEREAS, the Applicant and the Authority are entering into a Development Impact Project Agreement with respect to the Project of even date herewith;

NOW, THEREFORE, in consideration of the mutual covenants and agreements herein contained, the parties agree as follows:

1. The Authority will petition the Zoning Commission of the City of Boston on behalf of the Applicant (a) to rezone the portion of the subdistricts in which the Site is located from H-3 and M-2 to B-4, and (b) to designate the Site and such B-4 district as a Special Planning Overlay District Planned Development Area.

2. The Project shall be developed in a manner consistent with the Master Plan PDA. A development plan for each Component conforming to the Master Plan PDA shall be submitted to and approved by the Authority in accordance with Section 3-1A of the Code (a development plan so approved by the Authority being called a "Development Plan"), provided that the lack of a Development Plan for any Component shall not affect the ability to proceed with any other Component with a Development Plan, it being understood that each Component may be developed as a separate project, independent of any other Component. Each Component may be developed in accordance with its Development Plan, subject to the Review

Procedures set forth in Paragraph 3. The parties acknowledge that the Garage Development Plan and the Center Development Plan constitute Development Plans for the purposes hereof.

3. On May 15, 1991, the Applicant submitted to the Authority a combined Draft Environmental Impact Report pursuant to the Massachusetts Environmental Policy Act and Draft Project Impact Report ("DPIR") for the Site dated May 15, 1991 pursuant to Article 31 of the Boston Zoning Code. On September ___, 1991, the Authority issued its Preliminary Adequacy Determination with respect to the DPIR pursuant to Section 31-5 of the Code. On September ___, 1991, the Applicant submitted to the Authority a Final Project Impact Report (the "FPIR") in response to said Preliminary Adequacy Determination. The Authority hereby agrees to issue a FPIR Adequacy Determination approving the FPIR upon the expiration of the 30 day public comment period provided for under paragraph 5 of Section 31-5 of the Code. Upon the issuance of such FPIR Adequacy Determination, the development of the Project shall be subject to the Development Review Procedures of the Authority dated 1985, revised 1986 (the "Review Procedures"), a copy of which is attached hereto as Exhibit G, to ensure continued compliance with the approved FPIR. A violation of the with respect to a particular Component shall not be considered a violation of the Review Procedures with respect to any other Component, whether or not such other Component is being developed by the Applicant or any assignee or designee thereof. This Agreement shall be deemed to satisfy the requirements of Section 31-14 of the Code.

4. The Applicant shall submit a Construction Management Plan ("CMP") for the Project to the Project Advisory Committee for its review and to the Commissioner of Transportation of the City of Boston prior to issuance of a building permit for the construction of any portion of the Project. The CMP will identify construction, traffic, and parking impacts and specify mitigating measures to be implemented during the construction of the Project that are reasonably satisfactory to the Commissioner of Transportation. The CMP will include, as specific mitigating measures to be implemented during the construction of the Project the following:

(a) a prohibition of construction activities prior to 9:00 A.M. on Saturdays, and a limitation of Saturday construction to interior work;

(b) a prohibition of pile-driving on Saturdays and prior to 8:00 A.M. and after 4:00 P.M. on weekdays;

(c) a prohibition of the operation of heavy machinery prior to 7:00 A.M. on weekdays;

(d) a prohibition on the use of East Brookline, East Concord and East Newton Streets by construction vehicles; and

(e) a limitation of the hours of construction between 7:00 A.M. and 4:00 P.M. on weekdays, and between 9:00 A.M. and 4:00 P.M. on Saturdays;

(f) a prohibition on construction worker parking on the Star Brush lot on East Brookline Street and Harrison Avenue, which may be used for employee parking, provided the lot is cleared of debris, aesthetically landscaped and appropriately

fenced, subject to Project Advisory Committee ("PAC") review, referenced in paragraph 14(j) of this Agreement, and maintained by University Hospital.

The CMP will also require that all pile-driving be conducted in accordance with all applicable Federal, State and local regulations. The Applicant shall require that its contractor employ a pile-driving method similar to that employed for the construction of the University Hospital Atrium building with the goal of minimizing impacts on the surrounding neighborhood.

5. The Applicant shall enter into a Transportation Access Plan Agreement (the "TAP Agreement") with the Commissioner of Transportation prior to issuance of a building permit for the construction of any portion of the Project. The TAP Agreement shall be submitted to the Project Advisory Committee for its review prior to submission to the Commissioner of Transportation and the TAP Agreement will identify traffic and parking impacts of the Project and specify mitigating measures and Project goals that are reasonably satisfactory to the Commissioner of Transportation. In connection with the establishment of a Project Advisory Committee, as set forth in Paragraph 14 of this Agreement, three members of the Committee shall serve as members of a working group with the Applicant in addressing the transportation issues and travel demand management program. In order to assure that the transportation impacts of the Project are adequately managed, the City will require through its TAP Agreement that the Applicant monitor traffic generation and mode split annually from the date of

occupancy through completion of the Project, with a goal of increasing public transit modal split percentage by one percentage point every two years for the next ten years. The TAP Agreement will address the following travel demand management improvements:

(a) the formalization of the Inter-institutional Transportation Management Association with University Hospital, Boston University Medical Center and Boston City Hospital;

(b) the promotion of ridesharing through Project marketing efforts;

(c) the implementation of a computerized ridesharing program, including vanpooling;

(d) the establishment of preferential parking program for vans and carpools;

(e) the encouragement of employers to implement alternative work schedules by staggered work hours, flexible work hours and compressed work-week shifts; and

(f) the establishment of preferred parking rates for vanpool and carpool vehicles.

The TAP Agreement will provide for an analysis of each of the above-referenced programs. The TAP Agreement will require the Applicant to coordinate a travel demand management improvement program with the Massachusetts Bay Transportation Authority ("MBTA") and to support the elimination of bus routes along East Concord and East Brookline Streets, with the goal of restricting such routes to main arterials in the neighborhood such as:

Harrison Avenue, Washington Street, Albany Street and Massachusetts Avenue. The Tap Agreement will also address the operation of the existing parking facility on the Site and require that the Applicant relocate the present collection parking booth away from Albany Street to eliminate queuing of traffic onto Albany Street and the adjacent side streets. Such relocation plan will also include a separate entrance lane for monthly passholders to eliminate queuing and will increase the number of vehicular entrances to the surface parking lot. In connection with the program to work with the MBTA, the Applicant shall analyze the feasibility and make recommendations regarding the establishment of a bus route from Ruggles Station to Broadway Station utilizing Melnea Cass Boulevard and Albany Street.

6. The Applicant has contracted with (a) Cannon as the architect for the Center, and (b) Zaldastani Associates, Inc. ("Zaldastani") as the architect for the Garage.

7. (a) The Authority hereby approves (1) the Schematic Design for the Center prepared by Cannon as set forth in the plans attached as Exhibit B to the Center Development Plan and (2) the Schematic Design for the Garage prepared by Zaldastani as set forth in the plans attached as Exhibit B to the Garage Development Plan.

(b) The Authority hereby accepts the Vote of the Boston Civic Design Commission ("BCDC") of its recommendations with respect to the Master Plan PDA. The Applicant and the Authority agree to work together to implement the recommendations of the BCDC

with respect to Phase II to the extent of, and conditioned upon the incorporation into the Project Site of additional State land available upon the relocation of the Massachusetts Avenue Connnector resulting from the Central Artery Project. To the extent that such recommendations require the amendment of the Master Plan PDA and the submission of additional development plans for any Components of Phase II of the Project, the Authority agrees to accept such amendments as necessary for the successful completion of the Project. Such amendments shall be subject to the Project Advisory Committee, Community review and BRA review. A copy of the BCDC recommendation is attached hereto as Exhibit H.

(c) After the Authority's approval of the Master Plan PDA, the Applicant submitted to the Authority a Master Plan Report for the Project (the "Master Plan Report"), a copy of which is attached hereto as Exhibit I. Having reviewed the Master Plan Report, the Authority hereby (i) approves the height, gross floor area, general footprint, envelope and location proposed for Buildings 3, 4, 5 and 6 as set forth therein, and (ii) agrees not to withhold approval of future design submissions by the Applicant because of the height, gross floor area, footprint, envelope and location proposed for Buildings 3, 4, 5 or 6 so long as the same are consistent with the Master Plan Report, and consistent with the following Master Plan objectives:

(a) the extension of the East Brookline, East Newton and East Concord Street patterns through the Site;

(b) the development of focal points along the extensions

of East Brookline and East Newton Streets through the Site;

(c) the maximization of public accessibility to and through open spaces and the Pedestrian Plaza;

(d) the extension of landscaping, street furniture, paving materials and other landscaping elements throughout the Site and into the surrounding areas;

(e) the consideration of below-grade parking underneath the buildings to be located on Parcels C, D, E and F.

The submission of future Development Plans for Components of the Project shall be subject to review by the Project Advisory Committee, the South End Community ("Community") and the BRA. To the extent that the Final Environment Impact Report and the FPIR require the establishment of mitigation for wind impacts from the Project, the Applicant shall take such mitigation actions as required, including the installation of canopies and extensive landscaping to mitigate such impacts.

8. In complying with the Review Procedures discussed in Paragraph 3 above and in connection with the development of each Component for which the Authority has approved a Development Plan, the Applicant will submit to the PAC and the Authority submissions required by the Review Procedures. It shall be the Applicant's responsibility to notify the Authority and the PAC of proposed material changes to public lobbies visible from the exterior of buildings, open spaces and landscaping and exterior features of buildings from previously approved submissions (other than refinements of details generally consistent with such previously

approved submissions). Such changes shall be reviewed by the PAC and approved by the Authority prior to incorporating them into the drawings and specifications. The Authority shall perform its functions under this provision promptly and with all reasonable dispatch and in accordance with the provisions of this Agreement, and shall approve or disapprove such a change (i) within seven (7) days of its submission to the Authority, and (ii) when the Authority disapproves such material change, its disapproval shall include a detailed written explanation therefor. If the Applicant receives no notification from the Authority of disapproval within seven (7) days after submission of said change, such change shall be deemed approved.

9. Once Contract Documents for any Component of the Project have been approved, the only further submissions to be made by the Applicant to the PAC for review and the Authority for approval hereunder with respect to such Component will be contract addenda and requests for those change orders in the construction of those items subject to the Review Procedures ("Reviewable Change Orders") that (a) make material changes to public lobbies visible from the exterior of buildings, open spaces, landscaping or exterior features of buildings from previously approved submissions for any Component, and (b) have a cost of construction greater than $100,000. Contract addenda or change orders which do not constitute Reviewable Change Orders may be made without Authority review or approval. The Authority shall perform its function under this provision promptly and with all reasonable dispatch, and shall

approve or disapprove Reviewable Change Orders (i) within seven (7) days of their submission to the Authority, and (ii) when the Authority disapproves a Reviewable Change Order, its disapproval shall include a detailed written explanation therefor. If the Applicant receives no notification from the Authority of such disapproval within seven (7) days after submission of said Reviewable Change Order, such reviewable Change Order shall be deemed approved.

10. The Authority will informally advise the Applicant concerning, and will actively cooperate with and publicly support, the Applicant's efforts to obtain from the appropriate municipal, state and federal bodies and agencies all such permits, licenses and approvals, and exceptions, variances and other departures from the normal application of the applicable zoning and building codes and other ordinances and statutes, which may be necessary or convenient in order to carry out the development of the Site in accordance with the PDA Master Plan and each Development Plan to fulfill the Applicant's obligations hereunder in the most expeditious and reasonable manner, and to actively cooperate with and publicly support the Applicant's efforts to obtain from the appropriate municipal, State and Federal bodies and agencies the development rights and ownership of the land adjoining the Master Plan PDA Site which will result from the relocation of the Massachusetts Avenue Connector resulting from the Central Artery Project ("State Land Parcel"). The Authority agrees that the State Land Parcel and the adjacent "Strumph" parcel may be developed in

accordance with the Master Plan PDA, provided that the Applicant submits an application to amend the Master Plan PDA to incorporate such additional parcels into the Master Plan PDA Site. The Applicant agrees that no development will take place on the adjacent parcel until a development plan has been filed with the Authority and reviewed by the Project Advisory Committee, the Community and the BRA.

11. The Applicant anticipates that construction of the Center will commence in the last quarter of 1991 and be completed in by the end of 1993. It is estimated that construction of the Garage will commence in the second quarter of 1992 and be completed in early 1994, and that construction of the medical arts building on Parcel C will commence in late 1992 with completion in late 1994. The forgoing anticipations and estimates do not take into account any delays which may result from causes beyond the Applicant's reasonable control, and are therefore subject thereto. After construction has commenced on the Site, and provided that work within the Master Plan PDA has commenced and is diligently proceeding, the Authority will, within 30 days of a request by the Applicant, file with the Building Commissioner of the City of Boston a certificate pursuant to Section 6A-1 of the Code indicating that work within the Master Plan PDA has commenced and is diligently proceeding. In the event that construction on any of the Components within the Project is not commenced within two years after the grant of an exception by the Board of Appeals, pursuant to Article 6A of the Zoning Code, then the Exception shall lapse

and the Applicant shall be required to resubmit a request for such Exception and submit such plans for Project Advisory Committee and BRA review.

12. The Applicant will execute a Boston Residents Construction Employment Plan, consistent with the requirements of the Boston Residents Jobs Policy established by Chapter 30 of the Ordinances of 1983 and the Mayor's Executive Order Extending the Boston Residents Jobs Policy dated July 12, 1985 and which sets forth in detail the Applicant's plan to ensure that its general contractor, and those engaged by said general contractor for construction of the Project on a craft by craft basis, use good faith efforts to meet the following Boston Residents Construction Employment Standards: (1) at least 50% of the total employee worker hours in each trade shall be by bona fide Boston residents; (2) at least 25% of the total employee worker hours in each trade shall be by minorities; and (3) at least 10% of the total employee worker hours in each trade shall be by women. Said plan shall include provisions for monitoring, compliance and sanctions. Worker hours, as defined in said plan, shall include on-the-job training and apprenticeship positions. The Applicant shall provide written confirmation of its commitment to promote job opportunities to residents of the South End and Lower Roxbury, and shall appoint an affirmative action officer to the Project on a full time basis to comply with the plan requirements.

13. The Applicant shall execute a Memorandum of Understanding and a First Source Agreement in connection with the Project. The

Memorandum of Understanding shall set forth an Employment Opportunity Plan which presents the Applicant's good faith effort to provide that fifty (50%) percent of employment opportunities created by the Project will be made available to Boston Residents. The First Source Agreement with the Mayor's Office of Jobs and Community Services shall provide for the Applicant to use the services of local community agencies prior to using the services of the Private Industry Council sponsored "Boston for Boston" placement office employment referrals before embarking on a general recruitment effort to fill entry-level positions within the Project.

14. (a) The Applicant shall provide to the Project Advisory Committee all reports, memoranda, letters, requests and submissions to the Boston Employment Commission furnished in accordance with Chapter 30 of the Ordinances of 1983 and shall cooperate with the Project Advisory Committee and seek recommendations from the Project Advisory Committee with respect to the Applicant's plan to comply with the Boston Residents Construction Employment Plan and to establish and meet the standards required pursuant to such plan and with the provisions contained herein relative to employment recruitment through local community agencies. The Applicant further agrees to incorporate in all construction contracts written confirmation from the authorized representatives of Boston University and University Hospital of the need for strict compliance with the Boston Residents Construction Employment Ordnance. During the construction of the Project, the Applicant

will require that its subcontractors and contractors adhere to the minority business enterprise and women's business enterprise standards established by the City of Boston for construction jobs and subcontracts, which requirement shall be incorporated with more particularly into the Boston Residents Construction Employment Plan. The Applicant shall include in the First Source Agreement a provision for close collaboration with local community agencies, for the employment of summer, school year and permanent positions for Community residents. Additionally, the Applicant shall require a series of recruitment drives within the Community to recruit candidates for positions in the jobs created through the Project with respect to permanent positions and shall solicit Community residents for employment through the submission, on a monthly basis, of available positions to Community groups identified by the Project Advisory Committee. The First Source Agreement shall also specify affirmative action hiring practices for permanent jobs and solicitation through appropriate City agencies and Community-based organizations.

(b) With respect to retail space available after the construction of the Project, the Applicant shall provide information on the tenancy on such space to the Project Advisory Committee and shall make a good-faith effort to recruit minority and women's businesses for such retail space. Such activities in leasing solicitations shall be reviewed by the Project Advisory Committee.

(c) The Applicant agrees to set aside one-third of the

enrollment of the day care facility for Community residents (who are not employees of Boston City Hospital, BUMC or University Hospital) and employees of Boston City Hospital, which at projected enrollment equals 10 spaces for the Community and 23 spaces for BCH, at employee rates, and will insure that the construction of the day care play area conforms to all Federal, State and local requirements.

(d) The Applicant shall also include in the Memorandum of Understanding and First Source Agreement a commitment to outreach and recruitment of local Community, Dorchester and Lower Roxbury residents for participation in the "Work Tech" program, to provide laboratories for Boston-based teachers to introduce Community, Dorchester and Lower Roxbury students to medical research and recruit Community, Dorchester and Lower Roxbury youth in an annual seven-week series of science classes at the School of Medicine. The Applicant shall also insure that Boston University Project personnel are eligible for tuition remission benefits to the same extent as such benefits are available to other personnel employed by Boston University. The Applicant shall provide for the creation of a local jobs creation proposal through the Project Advisory Committee to dedicate 50% of the jobs-linkage funds for use to benefit the Community. Such jobs creation proposal may take the form of job training program by the Project Advisory Committee and/or the Applicant.

(e) Prior to the submission of a Development Plan for Parcel C for use by University Hospital, the Applicant shall cause

University Hospital to submit a development plan for the residential re-use of the East Concord Street warehouse. Such development plan for the warehouse site shall be subject to Community and BRA review. Additionally, with respect to the existing Hospital buildings located to the north of Albany Street, including the Atrium Building, University Hospital agrees to explore all design alternatives which would minimize the impact of shadows from building additions onto East Brookline Street residential buildings. It is expressly agreed by the parties that nothing herein shall be deemed to constitute approval of any plans for the increase in height or dimensions of such structures. Any plans for the change in height or dimension of such structures shall be subject to PAC and BRA review. Notwithstanding the above, the Master Plan PDA provides for the development and construction of a bridge between the Proposed Medical Arts Building and University Hospital. Prior to the approval of a development plan for such building, the bridge must be submitted to the PAC, the Community and the BRA for review. Nothing contained herein shall be deemed to be approval of such bridge. University Hospital agrees to hire a full-time Liaison Officer to work with the PAC and the Community with the goal of establishing stronger relationships between University Hospital and the Community through activities such as: (i) initiation of more employee activity (walking tours, etc.) within the neighborhood; (ii) completion with PAC of analysis of institution's physical campus including access points, entries, and existing barriers (e.g.: ATM, tree planting, pharmacy) to make

the institution a more integral part of the neighborhood; and (iii) establishment of an on-going system of informing hospital employees of local housing opportunities.

(f) In implementing the Review Procedures, the Authority shall insure that lighting on the Site shall be positioned so that it does not impact on abutting residential neighbors and insure that the future buildings on the Master Plan PDA Site will not cast new shadows on the East Brookline Street residential buildings.

(g) The fence and gate located at the intersection of Stoughton Street and Harrison Avenue will be replaced subject to BRA and Community design review prior to the completion of the Immaculate Conception Housing renovation on Harrison Avenue.

(h) The Applicant shall establish an annual fund in the amount of $25,000.00 in cooperation with the Boston Parks Department and the Project Advisory Committee for the maintenance of the Blackstone Park, Franklin Park and the Worcester Square Park in the Community.

(i) The Applicant shall develop an affirmative action hiring plan for local Community, Dorchester and Lower Roxbury residents with the assistance of the PAC which includes: (1) local solicitation, (2) local advertising, and (3) Community monitoring through the Project Advisory Committee.

(j) The Authority agrees to cooperate with the Community to establish a Project Advisory Committee which shall consist of Community residents, evidencing the diversity of the neighborhood. The Project Advisory Committee shall establish a working

relationship with the Applicant and the Authority to actively monitor and work with the Applicant during the life of the Project. The Project Advisory Committee shall have access to all public information filed with the City of Boston and the Boston Redevelopment Authority in connection with this Agreement and the Project. The Committee shall establish a subcommittee to review and monitor environmental safety issues and shall be informed of all safety requirements and procedures in effect for the Project Site. In addition, the Project Advisory Committee shall designate two representatives from the Community to serve on the Boston University Medical Center Safety Committee and shall be provided with a list of all publicly funded research activities conducted in any Component; provided, however, that neither the Applicant nor any researcher is obligated to disclose proprietary information or information which may be in violation of any rule or regulation affecting such research. The Applicant shall identify an individual who is familiar with medical research within the Project and with the applicable Statutes and Regulations relating to medical waste, hazardous substances and hazardous waste, the operation and maintenance of medical laboratories and with emergency procedures. The Applicant shall provide to the Project Advisory Committee a report prepared by Boston University Medical Center entitled "Environmental Management at Boston University Medical Center, September 18, 1991, a copy of which is attached hereto as Exhibit J. Any updates of this Report shall be submitted to the Project Advisory Committee.

(k) The Applicant shall include in the operational procedures for the management of the garage specific requirements emphasizing user safety and security in the garage.

(l) In recognition of the importance of the South End Community Health Center, University Hospital agrees to participate in the long-term strategic planning for the health center.

15. (a) Any Component(s) contemplated by the Master Plan PDA for the Project shall be deemed completed when the Applicant has substantially completed construction of the exterior of the building, the public lobbies, entrances, and open spaces included in such Component, all substantially in accordance with approved Construction Documents and the same are substantially ready for occupancy, except for (i) items of work and adjustment of equipment and fixtures which can be completed after occupancy has occurred, e.g., so-called punchlist items, (ii) landscaping and other similar work which cannot then be completed because of climatic conditions or other reasons beyond the reasonable control of the Applicant and (iii) with respect to office, retail, research and development and other tenant space, items of work normally left for completion pursuant to the requirements of specific occupancy agreements and interior work to be performed to tenants' specifications. Upon completion of any Component, as aforesaid, the Authority shall issue to the Applicant a written certificate ("Certificate of Completion"), which shall be in recordable form and shall be conclusive evidence that said Component has been completed in accordance with the Master Plan PDA, the Development Plan for such

Component and this Agreement. Upon the completion, as aforesaid, of all Components comprising the Project contemplated by the Applicant's Master Plan PDA, the Authority shall issue to the Applicant a Certificate of Completion for the Project in recordable form, which shall be conclusive evidence that the Project has been completed in accordance with the Master Plan PDA and each Development Plan with respect thereto, and that all obligations to the Authority thereunder and under this Agreement have been fulfilled (except any obligation hereunder which by its terms survives the completion of construction of the Project, which obligation when cited in the Project Certificate of Completion shall survive the issuance of the Project Certificate of Completion).

(b) The Authority shall issue a Component or Project Certificate of Completion to the Applicant and to any mortgagee of any Component or the Project within thirty (30) days after the Applicant's request therefor. Any such Certificate of Completion shall be in suitable form for recording in the Registry of Deeds for Suffolk County, Commonwealth of Massachusetts. If the Authority shall refuse or fail to issue any such Certificate of Completion in accordance with the provisions of this Paragraph 15, the Authority shall, within said thirty (30) days after the Applicant's request, provide the Applicant with a written statement ("Non-Completion Statement"), indicating with specificity in what respect the Applicant has failed to complete the Component(s) or the Project, as the case may be, in accordance with the applicable

approved Development Plan(s), or is otherwise in default of its obligations to the Authority hereunder, and what measures or actions will be necessary, in the reasonable opinion of the Authority, for the Applicant to take or perform in order to obtain such Certificate of Completion; upon compliance by the Applicant with the requirements of any Non-Completion Statement for any Component or the Project, the Authority shall issue a Certificate of Completion for such Component or the Project, as the case may be. If the Authority shall refuse or fail to provide either a Certificate of Completion or a Non-Completion Statement to the Applicant or any such mortgagee within thirty (30) days after the Applicant's request for any Certificate of Completion, then the Certificate of Completion requested shall be deemed to have been issued. The Applicant and any such mortgagee may record an affidavit with said Deeds, which affidavit shall attest to the adequacy of notice to the Authority, the elapsed time without a response from the Authority, and the substantial completion of the Component(s) or the Project, as the case may be, in accordance with the provisions of this Agreement. Such affidavit shall be conclusive evidence as to the facts stated therein and as to the completion the Component or the Project, as the case may be, in accordance with the Master Plan PDA, the applicable Development Plan(s) and this Agreement.

16. (a) The Applicant agrees that it shall comply, and all tenants of space in the Center and any other Component(s) intended for medical research use shall be required to comply, with all

federal, state and local statutes, and any regulations promulgated thereunder, relating to the generation, processing and disposal of medical wastes, hazardous substances and hazardous wastes and to the operation and maintenance of health care facilities and medical laboratories.

(b) The Applicant agrees that the building management staff of each Component shall include an individual who is familiar with the tenant activity within such Component and with the applicable statutes and regulations relating to medical wastes, hazardous substances and hazardous wastes and the operation and maintenance of health care facilities and medical laboratories. Such individual shall be prepared to coordinate a response to any emergency which might occur at the Project involving medical wastes, hazardous substances or hazardous wastes. The Applicant agrees to use reasonable efforts to cause information relating to tenant activities involving any of such substances to be available to the Project Advisory Committee, except to the extent any such information may be proprietary or a trade secret.

(c) The Applicant shall include in all leases for laboratory space at the Project a requirement that all experiments involving the use of animals conducted at the Project shall be conducted in conformity with legal requirements of the current Guide for the Care and Use of Animals of the National Institute of Health and succeeding and revised editions thereof, the Animal Welfare Act (7 U.S.C. Section 2131 et seq.) and the federal regulations pursuant to said Act, the Public Health Service Policy on Humane Care and

Use of Laboratory Animals, all as amended from time to time, statutes and regulations of the Commonwealth of Massachusetts, and ordinances, executive orders and regulations of the City of Boston.

17. If, in the future, the Applicant shall, in its reasonable judgment, determine that it has become infeasible to proceed with the whole or portion of the PDA Master Plan or any approved Development Plan, then in such case and after substantiation by the Applicant deemed reasonably adequate by the Authority of the reasons for not being able to proceed, the Authority shall cooperate with the Applicant to modify, alter, or amend its previous approval of the Master Plan PDA, such Development Plan and this Agreement in order to allow the Applicant the opportunity to reasonably develop the land that it owns. If the parties acting in good faith cannot agree as to an appropriate modification, alteration, or amendment thereto, then the Authority agrees upon the Applicant's request to (i) revoke the PDA Designation for the Site if no portion of the Site has been developed in accordance with the Master Plan PDA or (ii) release from the Master Plan PDA those portions of the Site not developed in accordance therewith if a portion (but not all) of the Site has been developed in accordance therewith. Upon revocation of the PDA Designation for the Site, all obligations of the parties hereto shall terminate and be of no further force and effect. If the parties acting in good faith cannot agree as to an appropriate alteration, modification or amendment to the Master Plan PDA or any Development Plan and if the Applicant so requests, the Authority agrees that the Applicant

shall have no further obligation to proceed with such whole or portion, as the case may be, thereof.

18. The Authority acknowledges that, prior to approving (a) the Master Plan PDA, the Center Development Plan and the Garage Development Plan pursuant to Section 3-1A of the Code and (b) the Development Impact Project Plan set forth in the Master Plan PDA pursuant to Sections 26A-3(1), and 26B-3(1) of the Code, the Authority found that each thereof conforms to the general plan for the City as a whole and that nothing therein will be injurious to the neighborhood or otherwise detrimental to the public welfare.

19. This Agreement shall be binding upon and enforceable against the successors and assigns of the parties hereto (other than mortgagees of the Project or those claiming through mortgagees of the Project, unless said party obtains title to the Project and proceeds with development of the Project), it being understood and agreed that the Applicant shall have a right to transfer or assign to another party or parties its rights, obligations and interests under this Agreement and in all or a portion of the Site. Notwithstanding the foregoing, or anything to the contrary contained elsewhere in this Agreement, the parties acknowledge that the Applicant may transfer its interest in one or more subparcels within the Site to a third party ("Component Developer") for development of a Component thereon, and in such event, (a) upon the Applicant's request, the Authority shall enter into a Cooperation Agreement (a "Component Agreement") with such Component Developer (which shall be substantially in the form of this

Agreement except that the scope and provisions thereof shall be limited to such Component (as opposed to the entire Project), mutatis mutandis, and (b) the Applicant's obligations under this Agreement with respect to such Component shall be released, and no further liability shall accrue to the Applicant hereunder with respect thereto, from and after the execution of such Component Agreement by the Component Developer.

20. Subject to the provisions of Paragraph 19 above, each and every covenant contained in this Agreement is and shall be construed to be a separate and independent covenant applicable to each Component of the Project which shall apply separately to each Component , provided that in no event shall a default with respect to a particular Component under any section or provision of this Agreement constitute a default with respect to any other Component or the Project.

21. If any term or provision of this Agreement, or the application thereof to any person or circumstance, shall to any extent be invalid and unenforceable, the remainder of this Agreement, or the application of such terms to persons or circumstances other than those to which it is invalid or unenforceable, shall not be affected thereby, and each term and provision of this Agreement shall be valid and shall be enforced to the extent permitted by law.

22. The liability arising under this Agreement of the Applicant and of each successor or assign (including, without limitation, all mortgagees and Component Developers) of all or any

part of the Applicant's interest in the Project or any Component thereof shall be limited solely to such person's or entity's interest in the Project or such Component, as the case may be, and no partner, trustee, beneficiary, shareholder, officer, director or the like of any such person or entity, from time to time, or any such person's or entity's separate assets or property shall have or be subject to any personal liability with respect to any obligation or liability of such person or entity hereunder.

23. Whenever the consent or approval of the Authority is required hereunder, under the Review Procedures, or otherwise, such consent or approval shall not be unreasonably withheld or delayed, or wherever there is a requirement that any thing, act or circumstance shall be satisfactory to the Authority or shall be done and performed to the Authority's satisfaction or any other requirement of similar import, the Authority covenants not to be unreasonable with respect thereto.

24. Authority shall, within ten days after written request therefor by the Applicant or any mortgagee of the Project or any portion thereof, provide a certificate in writing, as requested or applicable, that this Agreement or any particular Paragraph hereof specified by the requesting party is in full force and effect and unmodified, or in what respects the Agreement is no longer in force or effect or has been modified, that the Applicant is in compliance with this Agreement or any particular Paragraph hereof specified by the requesting party, or in what respects there is non-compliance, or as to any other matter reasonably related to the Project which

the requesting party may reasonably request of the Authority.

25. The Authority has authorized the Director of the Authority to take any action hereunder on behalf of the Authority (including, without limitation, the granting of consents or approvals and the execution and delivery of certificates), and any action so taken shall be binding upon the Authority.

26. All notices or other communications required or permitted to be given under this Agreement shall be in writing, signed by a duly authorized officer or representative of the Authority or the Applicant, as the case may be, and shall be either hand delivered or mailed postage prepaid, by registered or certified mail, return receipt requested and shall be deemed given when delivered, if by hand, or when deposited with the U.S. Postal Service, if mailed to the principal office of the party to which it is directed, which is as follows unless otherwise designated by written notice to the other party:

Applicant:	UNIVERSITY ASSOCIATES LIMITED PARTNERSHIP c/o Mr. Robert F. Walsh Robert F. Walsh and Assoc. 307 West First Street South Boston, MA 02127
with a copy to:	Rubin and Rudman 50 Rowes Wharf Boston, MA 02110 ATTN: James H. Greene, Esq.
Authority:	Boston Redevelopment Authority 1 City Hall Square Boston, MA 02201 ATTN: Director
with a copy to:	Boston Redevelopment Authority 1 City Hall Square Boston, MA 02201 ATTN: Chief General Counsel

EXECUTED as of the date set forth on the first page hereof.

BOSTON REDEVELOPMENT AUTHORITY

Approved as to Form:

Assistant General Counsel

By: Stephen Coyle, Director
Duly Authorized

UNIVERSITY ASSOCIATES
LIMITED PARTNERSHIP

BY: Trustees of Boston University,
General Partner

By: Kenneth G. Condon
Vice President for
Financial Affairs and
Assistant Treasurer

BY: Univer Development Foundation,
Inc., General Partner

By: Michael D. Blaszka,
Treasurer

12/3/91

LIST OF EXHIBITS
to
COOPERATION AGREEMENT
for
PLANNED DEVELOPMENT AREA NO. 41

South End Technology Square

Exhibit A	Legal Description of Site
Exhibit B	Legal Description of Parcels A and B
Exhibit C	Master Plan PDA
Exhibit D	Center Development Plan
Exhibit E	Garage Development Plan
Exhibit F	BRA Vote
Exhibit G	BRA Development Review Procedures dated 1985, revised 1986
Exhibit H	BCDC Approval
Exhibit I	Master Plan Report
Exhibit J	Report entitled "Environmental Management at Boston University Medical Center," dated September 18, 1991

APPENDIX E

HISTORICAL/ARCHAEOLOGICAL REPORT

University Associates: Albany Street Project
Historic/Architectural Report

I. Introduction

This chapter on cultural resources in the vicinity of the University Associates: Albany Street Project responds to questions raised by the Executive Office of Environmental Affairs, the Massachusetts Historical Commission, and the Boston Redevelopment Authority on behalf of the Boston Landmarks Commission following their review of the Project Notification Form. Briefly, the comments directed the University Associates to consider the potential effects of the proposed project, including its height, scale and massing, on surrounding historic/architectural and archaeological resources. The South End District, which is formally designated by the Boston Landmarks Commission and the National Register of Historic Places, was specifically identified.

This chapter responds to those comments by providing the following information:

- a brief history and current description of the proposed project site and its immediate environs;
- identification of currently designated and potential National Register properties (36 CFR part 60), and Boston Landmarks (MGL, Chap. 772, 1975) in the proposed project vicinity;
- analysis of the potential effect of the proposed project on those historic/architectural and archaeological resources;
- mitigation measures

In summary, the proposed project is consistent with both the historic setting of the South End District, and with its specific architectural characteristics. That opinion is based on two main considerations. First, the site plan and massing of the proposed project help to mend the irregular urban edge that now exists along Albany Street. By filling a long-vacant lot, the proposed project helps give definition to the southern edge of the South End while screening the major negative effect of the Massachusetts Avenue Connector/South East Expressway. Second, the architectural design of the proposed project is informed by the scale, massing, materials, and architectural detail of neighboring South End institutional buildings, and by the street plan of the district. The proposed project goes well beyond the South End Harrison/Albany Protection Area Guidelines to respect the historic and architectural character of the South End. The reasons for these conclusions will be elucidated in the following text.

II. Historic Preservation Review

Because the proposed project is in proximity to designated and potentially significant cultural resources, it is subject to design review by several historical agencies. First, at the local level, the Boston Landmarks Commission (BLC) reviews changes (under Chapter 772 of the Acts of 1977) to designated landmarks. In this case, their review will take place according to the published "Standards and Criteria for the South End Harrison/Albany Protection Area." This review is specifically limited to the issues of demolition, land coverage, height of structures, landscape and topography. The purpose of the review is "to protect views of the adjacent Landmark District, to ensure that new development of major alterations adjacent to the District is architecturally compatible in massing, setback, and height, and to protect light and air circulation within the District." (South End District Study Committee Report, 1983, p. 51)

Second, at the state level, the Massachusetts Historical Commission (MHC) reviews changes (under 950 CMR 71) to properties listed in the State Register of Historic Places (SRHP). The South End District is included in the SRHP by virtue of its National Register and Boston Landmarks designations. The proposed project site is included in the SRHP because it is within the Landmark Protection Area. MHC's review takes place according to the Criteria of Adverse Effect (950 CMR 71.05). This review looks at both direct and indirect effects including demolition and/or alteration, isolation and/or alteration from the surrounding environment, and introduction of incompatible visual, audible or atmospheric elements. The purpose of the review is to "eliminate, minimize or mitigate adverse effects to properties listed in the State Register... (so as) ...to protect the public's interest in preserving historic and archaeological properties...." (950 CMR 71.02)

Finally, at the federal level, the MHC as the State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation (ACHP) have the authority to review changes (under 36 CFR 800) to properties listed in, or eligible for listing in the National Register of Historic Places (NRHP). Like the State Register review, the National Register review takes place according the Criteria of Effect and Adverse Effect. (36 CFR 800.9) The purpose of the review is to "identify historic properties, assess effects on them, and consider alternatives to avoid or reduce those effects." (36 CFR 800.1C1 (ii)) Because the state and federal reviews are so similar, the State Register procedures specifically encourage coordination of the two. (950 CMR 71.04)

III. Methodology

The methodology involved six basic steps. These were consultation with agencies responsible for the protection of historical and archaeological resources; independent historical research; field inspection; review of schematic designs for the project area; identification of potential project impacts to significant historic, architectural and archaeological resources; and development of mitigation measures. The methodology builds on prior consultations by the project proponent to determine the concerns of the South End Historical Society, and the South End Landmark District Commission.

The first step identified currently designated and potentially eligible historic/ architectural and archaeological resources through consultation with the Massachusetts Historical Commission (MHC) and the Boston Landmarks Commission (BLC). These agencies provided the National Register of Historic Places (NRHP) nomination form for the South End District, and the South End Landmark District Report. They also provided the results of a historic/architectural survey of the Albany Street area that was conducted for the Central Artery project. A Landmark petition for a portion of Boston City Hospital has been filed with BLC, but no action has been taken. The archaeological files at the MCH did not record the presence of any known resources in the proposed project area.

The second step gathered and interpreted historical information about the site, primarily to determine if significant archaeological resources might be present. Historic maps and photographs, along with a very detailed 1986 site history prepared by Haley & Aldrich, Inc., were the major sources consulted.

The third step recorded the setting and current physical appearance of the historic/ architectural resources surrounding the proposed development site. This was accomplished through visual inspection of those resources. The purpose was to identify significant historic/architectural characteristics of the resources and their settings, and to assess views to and from the Landmark District.

The fourth step involved review of the Master Plan design for the proposed development site. Design is currently in a schematic phase.

The fifth step synthesized the above information to determine the potential effect of the proposed project on the significant characteristics of the surrounding historic/

architectural resources. To accomplish that goal, it analyzed the significance of those resources on the basis of the criteria cited by the NRHP and BLC designations. Effects were judged according to the Criteria of Effect and Adverse Effect established by the State Register of Historic Places (950 CMR 71) and Section 106 of the National Historic Preservation Act of 1966 (36 CFR 800), as well as the South End Harrison/Albany Protection Area Guidelines (Chapter 772).

The final step offers mitigation measures that are based on the numerous positive effects to historic/architectural resources that will be generated by the proposed project.

IV. History and Existing Conditions of the Proposed Project Site

Site History

The South End Landmark District Report provides a thorough, thoughtful history of the development and architecture of the South End. Thus, this section concentrates on the proposed project site and its immediate environs.

The City of Boston was originally confined to the Shawmut Peninsula, a small hilly area connected to the Roxbury mainland by a narrow strip of land (now Washington Street). In the early 19th century, efforts were initiated to expand the city's land area by filling the Back Bay, South Cove, and portions of Boston Harbor. The proposed development site was part of the tidal flats surrounding Boston's South Cove/Bay. "The western half of the site was covered by an oxbow lake and associated marshland, while the eastern half of the site was submerged. A narrow neck of solid 'dry' ground extended southward into South Bay in the central portion of the site...." (Haley & Aldrich 1986: 2; see Figure # 1)

The South End Landmark Report notes that, "A significant fact in the development of the South End is that much of the land is man-made. More than half of the area was once mud flats and marshes. The filling-in process was begun in the early 1800s and, by stages, virtually was completed by 1870. The result was a table-flat surface with only slight rises....." (Report 1983: 6) As might be expected, the landfill operations proceeded in a southwesterly direction from the established land mass of the Shawmut Peninsula. The Front Street Corporation of 1804 created land between Beach and Dover Streets in the city's first large-scale venture of this type. Development activity was

initially quite slow, and remained confined to the area adjacent to the Shawmut Peninsula. As late as 1833, the South Cove Company was chartered to create land in the present Chinatown, garment and leather districts. The pace of development soon quickened however, with Northampton, Concord, Brookline and Newton Streets laid out further to the east, perpendicular to the spine of Washington Street. (Landmark Report 1983: 8)

The proposed project site created in the early 1850s, with a narrow canal known as the Roxbury Canal paralleling its southern edge. A mooring slip at the eastern edge of the site ran north from the Roxbury Canal toward Albany Street. The mooring slip was partially filled c1936. The Roxbury Canal was buried between 1957 and 1976. (Haley & Aldrich 1986: 2; see Figure # 1)

From the beginning, the proposed project site was relegated to service and industrial uses due to its proximity to the "noxious" Roxbury Canal. Across the street, the Boston City Hospital Buildings of 1861 and the Homeopathic Hospital of 1876-84, were specifically sited with their backs to Albany Street and the unhealthful influence of the canal. A turn-of-the-century history of BCH described the situation thus:

> The hospital site had previously been used for the so-called Agricultural Fair Grounds at the South End of Boston. At high tides the land was flooded. The site is what is known as 'made land,' and gravel used in bringing the grounds to proper level was brought from Braintree. The average grade of the surface is 7 feet above the original level, and the ground grade of the buildings is fully 17 feet above mean low water....Not even the malodorous breezes from the putrid South bay disconcerted the City Fathers at that time." (Rowe 1906: 4-7)

The remainder of the site history is devoted to the buildings that were located there from c1860 to c1977. It provides summary information on usage and appearance as well as construction and demolition dates. It is drawn largely from a report prepared by Haley & Aldrich, Inc. in 1986. It divides the site into three parts: Central, Eastern, and Western. When specific buildings are mentioned they are keyed to Figure # 1 by a letter designation.

Central One-Third of Site

Haley & Aldrich, Inc, determined that:

> a collection of one and two-story brick and wood structures, indicated as buildings **M, N, O, P, Q, R, S, T, V, and W** were erected in the central one-third of the site in approximately 1860, and were reportedly used as military barracks and stables by the United States Army or State Militia from 1860 until approximately 1868. The ownership of the buildings and the property upon which they were built were transferred to the City of Boston in approximately 1868. (Haley & Aldrich 1986: 2-3)

The proximity of Boston City Hospital supports this type of use at the site during the Civil War and its aftermath.

After 1868, these buildings were taken over by the City of Boston Health Department - Street Cleaning Service, and were used as a city stable and wagon storage facility. The 1882 Hopkins Atlas shows the buildings arranged around a central courtyard in a U-shape. (see Figure # 2) The 1902 Bromley Atlas shows a two-story masonry stable, indicated as building **BB**, occupying much of the courtyard area. (see Figure #3) There are some indications that this building might have been on the site in the 1860s. (Haley & Aldrich 1986: Appendix A)

In 1917 the City of Boston Public Works Department - Street Cleaning and Sanitary Services Division, took occupancy of the central portion of the site. This municipal department added building **U** to enclose the rear of the complex c1901. In 1948 the Street Paving Division of the Public Works Department took control of this central portion of the site. Buildings **M, P, Q, R, S, T, U, V, and W** were razed between 1934 and 1957. The remaining buildings **N, O, and BB** were used for storage, a paint shop, a carpentry shop, and a motor equipment repair and storage facility from c1948 until 1976. They were razed between 1977 and 1984. (Haley & Aldrich 1986: 3, Appendix A)

Eastern One-third of Site

This portion of the site was occupied by the Street Paving Division of the Boston Public Works Department from c1868 until c1976. Building **X** was erected along Albany Street c1868. This two-story brick building appears on the 1882 Hopkins Atlas (see figure #2). Building **X** was used for storage and office space until it was razed c1949.

A three-story brick building **(AA)** was constructed at 624 Albany Street in 1923. It housed a municipal garage, vehicle repair shop, blacksmith shop and carpentry shop until it was razed c1977.

Building **Y** was a one-story wood-frame building that stood on Albany Street from the time of its construction c1939 until it was razed in c1977.

Building **Z** was erected on Albany Street c1949. This one-story wood frame building was used by the Public Works Department as an office building until c1977 when the building and the property surrounding it were transferred to the Boston Traffic Police Department. That department operated a tow truck radio dispatch office from this building until it was demolished in the late 1980s

Western One-Third of Site

This portion of the site was occupied by the City of Boston Water and Sewer Services from c1860 until c1977. Buildings **F, G, I and J**, all one-story wood-frame structures dating to the 1860s, were the earliest buildings in this area. (see figure #2) Building **F** was a storage facility razed c1901. Building **G** was a carpenter's shop razed c1934. Buildings **I and J** were attached stable and storage facilities, both of which were demolished c1928. (Haley & Aldrich 1986: Appendix A)

Building **C** was another wood-frame structure constructed on Albany Street in 1882/83. It was used by the Boston Street Lamp Department until 1897 when it was transferred to the Rising Sun Street Lighting Company. It was razed c1917. (Haley & Aldrich 1986: Appendix A)

Building **D** was a one-story wood-frame structure constructed on Albany Street by the Sewer Department c1887. It served as an office and storage facility until it was razed c1977. (Haley & Aldrich 1986: Appendix A)

Building **B** was a two-story brick building constructed on Albany Street in 1889 as a storage facility for the Sewer Department. When the Boston Water and Sewer Departments were combined in 1957, this building was used a vehicle parking garage, carpentry shop and emergency crew bunkroom. It was razed c1977. (Haley & Aldrich 1986: 4)

Building **A** was a three-story granite and brick building constructed on Albany Street in 1890 by the Water Department. It housed a machine shop on the first, second and third floors, as well as a water meter repair and testing shop, plumbing shop, equipment storage room, and offices. It was razed c1977. (Haley & Aldrich 1986: 4)

Building **E** was a small one-story wood-frame building constructed near the southwest corner of the site in 1899 by the Water Department. It served as a paint shop and wagon storage facility until it was razed c1928. (Haley & Aldrich 1986: Appendix A)

Building **L** was a small one-story brick building constructed c1917 as a gasoline storage building. It was razed c1977. (Haley & Aldrich 1986: Appendix A)

Building **H** was another small one-story brick building constructed c1922 as a kerosene and oil storage facility. It was razed c1977. (Haley & Aldrich 1986: Appendix A)

Building **CC** was a one-story brick building constructed on Albany Street c1949 as a parking garage. It was razed c1977. (Haley & Aldrich 1986: 4)

Building **K** was a one story wood-frame building constructed c1960 as a storage facility. It was razed c1977. (Haley & Aldrich 1986: Appendix A)

Existing Conditions Description

The University Associates Albany Street Project is located near the southwest corner of the South End proper in an area that has historically been devoted to institutional/ medical uses. The 16 acre site is bounded by Albany Street (N), the Massachusetts Avenue Connector (S), and proposed extensions of East Concord Street (W) and East Brookline Street (E). .It is currently devoid of buildings and used for surface parking. This parcel abuts the South End National Register District (5/8/73) and the South End Landmark District (11/14/83) and is within the South End Harrison/Albany Protection Area (11/14/83). The overall character of the area surrounding the proposed project site is extremely varied. When specific structures are cited, they are keyed by number to a site plan. (Figure #4)

The Massachusetts Avenue Connector (S) is a major elevated highway corridor that sweeps down from the Southeast Expressway (E) to ground level behind the site. (#1) This piece of modern transportation engineering is the antithesis to the pleasant residential streets and squares that define the South End District. Its adverse effect on the district is compounded by the massive bulk of the modern Suffolk County Correctional Facility looming behind it.

The approximately eight-story Boston City Hospital (BCH) Power Plant stands west of the site. (#2) This modernistic building, with its angled glass facade, is at odds with the character of the South End District. It is set well back from Albany Street, and is surrounded by a paved surface parking lot. Similarly, the one-story warehouse to the east is a blocky modern structure surrounded by an asphalt parking lot. (#3)

The north side of Albany Street, opposite the proposed project site, is devoted to institutional/medical usage. The buildings opposite the central and eastern portions of the site, centered on East Newton and East Brookline Streets, are modern high rise medical facilities ranging in height from approximately seven to fourteen stories. The only exception is an undistinguished brick four-story plus mansard building (#10) at the northwest corner of East Brookline Street.

The buildings at the west end of Albany Street, centered on East Concord Street, are late 19th and early 20th century medical facilities.

The northwest corner of Albany and East Concord Streets is part of the BCH Campus. That campus is now dominated by multi-story turn-of-the-century red brick buildings with Beaux-Arts style detail. The three buildings that form the corner opposite the proposed project site are described here. Directly on the corner is the six-story Maternity Building of 1925. (#4) This sparsely detailed Beaux-Arts style building is red brick with cast stone trim. The seven-story Surgical Building of 1928 is adjacent to the north on East Concord Street. (#5) It employs the same materials, but is more elaborately detailed with neo-Federal motifs including splayed lintels, some arched windows with swags, engaged Corinthian pilasters, and a modillion cornice. The five-story Warehouse Building of 1934 is adjacent to the west on Albany Street. (#6) Once again, this building is red brick with cast stone trim, but its limited decorative features are drawn from the Art Deco style.

The northeast corner of Albany and East Concord Streets is occupied by the former Homeopathic Hospital of 1876-84. This building is oriented toward the South End and faces its back toward Albany Street. The main building is a handsome four-story red brick with sandstone trim structure combining elements of the Victorian Gothic, Panel Brick and Romanesque Revival styles. (#7) It is characterized by a highly irregular silhouette with dormers, tall chimneys, and several towers. It faces north to a landscaped courtyard. Typically, the rear elevation (S), which faces Albany Street, is more utilitarian. It is separated from Albany Street by a concrete block wall, a one-story period outbuilding, (#8) and a large corrugated metal shed. (#9) Little of the historic/ architectural character of the building is apparent from Albany Street and the proposed project site.

Albany Street itself is a broad east-west artery. It suffers from the lack of cohesion in any of the elements that currently line it.

Views of the South End from the proposed project site are blocked by overhead pedestrian bridges on East Concord and East Newton Streets. East Concord Street is generally lined by turn-of-the-century multi-story medical buildings. Two are linked by a single level bridge at second story height. The 350' Administration Building of the Christian Science Center terminates the view. East Newton Street is lined by modern high rise medical buildings. Two are linked by a triple-level bridge at the second, third, and fourth stories. The 52-story Prudential Tower terminates the view. The unobstructed view down East Brookline Street, with its bowfront rowhouses, also terminates at the Prudential Tower. Views from the South End District toward the proposed project site are similarly obstructed by the pedestrian bridges. These views presently have no terminus. Rather, they bleed out over the vacant proposed project site and adjacent parking lots to the Massachusetts Avenue Connector.

V. Cultural Resources in the Proposed Project Vicinity

This section provides summary information on designated and potentially significant historic and archaeological resources in the project vicinity. Each property is presented in terms of its designation status, and the reasons for its historical/architectural significance.

South End District

a. Designation Status

The district was listed in the National Register of Historic Places on 5/8/73. It was designated as a Boston Landmark on 11/14/83. It is thus included in the State Register of Historic Places. (see Figure #5)

b. Summary Significance

The National Register nomination form and Landmark reports both cite similar reasons for the historic and architectural significance of the district. That significance is based on its historical role as a melting pot for the city's immigrants, as an example of urban planning based on English models, and as the largest intact Victorian rowhouse district in the United States.

The Landmark Report describes its architecture thus:

> The residential buildings which predominate the South End are the red brick rowhouses of four or five stories with double basement and mansard roof. Characteristic architectural features include decorative entrance canopies, decorative iron-work and granite or brownstone trim. The most popular styles of houses are the bow front, the flat front, and the angle bay. There are some brownstone buildings, some smaller three-story houses, a few frame houses, and some larger apartment buildings and commercial structures. A major element of the South End is its many distinctive churches and associated structures. Important also are the municipal and civic buildings that, with few modern exceptions, relate in style, materials, and design to the overall framework. On many of the short, residential blocks, the look and feel is much as it was a hundred years ago, and it is the automobile and the T.V. antennae that announce the century. (Report 1983: 6)

South End Harrison/Albany Protection Area

a. Designation Status

This area was designated by Boston Landmarks Commission on 11/14/83 "so as to maintain a transitional area adjacent to the Landmark District." (Landmark Report 1983: 32) It is thus included in the State Register of Historic Places. (see Figure #5)

b. Summary Significance

According to Chapter 772, a protection area is "contiguous to and constitutes an essential part of the physical environment of any Architectural Conservation District, Landmark or Landmark District." (Chapter 772, sec.2) According to the South End Landmark Report, "the areas to the north and east within the Study Area that have suffered extensive demolition and rebuilding, or that were never of the character of the rest of the Study Area, are proposed to comprise the Protection Area." (Report 1983: 32)

Boston City Hospital

a. Designation Status

Petitions have been filed to designate buildings B,C,D and F,G,H as Boston Landmarks. No action has been taken by the Landmarks Commission.

b. Summary Significance

Boston City Hospital is important for its seminal role in the development of city health services. Its earliest buildings, consisting of a domed administration building framed by two pavilion wards, were designed by noted architect Gridley J. F. Bryant in 1861. Despite the fact that hospitals of the period were usually site with southern exposures, BCH was specifically oriented northward to the South End with its back to the noxious Roxbury Canal on the south side of Albany Street. Over the years the hospital was constantly expanded and rebuilt, so that the present campus represents a "second generation" hospital. Gridley's two pavilion wards have survived however, and are the subject of the Landmark petition.

Homeopathic Hospital

a. Designation Status

The Homeopathic Hospital is not the subject of any formal historic designation. The Central Artery/Third Harbor Tunnel Survey recommended it for individual listing in the National Register of Historic Places. No action has been taken on this recommendation.

b. Summary Significance

"This complex of High Victorian Gothic structures, designed by William R. Emerson (Main Building 1876) and the firm of Allen and Kenway (other structures 1884) originally housed a homeopathic hospital renowned for its high cure rate.

Homeopathic medicine, popular in the 19th century, involved the treatment of diseases by the administration of minute doses of a remedy which in healthy patients would produce symptoms of the disease treated. The complex is significant as a relatively intact and rare example of institutional architecture in the High Victorian Gothic style." (Boston Affiliates 1989)

Archaeological Properties

a. Designation Status

According to MCH files, there are no known or designated archaeological properties on the proposed project site.

b. Summary Significance

The proposed project site was part of the South Cove tidal flats until the mid 19th century. In the 1850s the site was filled by the city and used for service departments like the City Stable, Sewer Division, and Paving Department. It served in this capacity until the 1970s when the site was cleared. The 100 year use of the site by the City is well documented. It does not appear that significant archaeological resources are likely to exist.

VI. Analysis of Potential Effects

This section of the report examines the potential effects of the proposed project on the resources cited above.

South End District and Harrison/Albany Protection Area

The proposed plan generally conforms to the guidelines for the Protection Area. The overall goal of those guidelines is to limit the height of new construction to a scale compatible with the South End. The potential effects on the South End District and its Protection Area are measured according to the Specific Standards and Criteria set forth by the Landmarks Report. (Report 1983: 51; see Figure #5)

a. Demolition

"In general, demolition of structures in the Protection Area may be allowed subject to prior approval by the Commission."

Most of the buildings that previously occupied this site were demolished in the 1970s. The site is currently vacant of structures; no demolition is necessary.

b. Land Coverage

"Setbacks may not exceed ten (10) feet from the back of the sidewalk line unless otherwise approved by the Commission except that a setback of greater than ten (10) feet may be allowed if the setback is consistent with adjacent setbacks or if the site is adequately landscaped."

A setback of 15' from Albany Street is proposed to provide a more generous sidewalk, and to balance both the width of the street and the height of the proposed buildings. While somewhat more than the recommended 10' setback, this setback is substantially less than that of the adjacent BCH power plant (W) and warehouse. (E) Both of these buildings are centered on their lots amid large expanses of asphalt paving, and thus do not provide models to be emulated. The proposed project setback is far more sensitive to urban image of the South End. In addition, the sidewalk will be lined by trees and other landscape features.

c. Height of Structures

"New construction, reconstruction, exterior replacement or alteration may not produce buildings lower than thirty (30), nor taller than 150 feet in the area southeast of Albany Street.....Additions or penthouses higher than the allowed heights may be allowed if they are not visible from the nearest public way within the Landmark District."

Six structures are proposed for the site, ranging in height from approximately 82' to 144' plus a 24' penthouse. Three of the buildings are 110', while the sixth is 100'. The nine-story Office/Research Building is the only building to exceed the 150' height limit when its penthouse is taken into account. It is sited on Albany Street opposite the ten-story Solomon Carter Fuller Mental Health Center. The Fuller Center and adjacent seven to fourteen story high rise buildings will effectively screen the proposed Office/Research Building. Thus, it will not be visible from the nearest public way within the Landmark District. These existing buildings on the north side of Albany Street will effectively screen the remainder of the proposed project from the South End District as well.

The lowest building, the 82' parking garage, occupies the most sensitive portion of the site from a historic preservation perspective. It is located on the corner of Albany Street and the proposed East Concord Street extension, opposite the former Homeopathic Hospital and kitty corner from Boston City Hospital. The lower height in this area will effectively mitigate the minimal effect of the project on those potential historic resources.

d. Topography

"No major changes in topography are allowed within the Protection Area "

The site is nearly flat, resulting from mid 19th century landfill activities. No substantial change is proposed.

e. Landscape

"In general, landscape changes within the Protection Area must not obstruct views of the elements of the adjacent Landmark District from any public ways in the Protection Area. If surface parking adjacent to streets is proposed, then a visual barrier of landscaping is encouraged."

Landscaping is designed to soften building, sidewalk, and parking area edges, and is confined to those areas. It should be noted that views of the adjacent Landmark District are partially blocked on East Concord and East Newton Streets by overhead pedestrian bridges. The proposed project will not further obstruct those views. A small surface parking area and helicopter pad have been placed at the rear of the site adjacent to the Massachusetts Avenue Connector and away from the historic district, to minimize the impact on the South End District. This area is further screened by extensive plantings.

State and National Register Review

These twin reviews look at both direct and indirect effects including demolition and/or alteration, isolation and/or alteration from the surrounding environment, and introduction of incompatible visual, audible or atmospheric elements. No direct effects to historic resources are possible because the project site is vacant, precluding any possibility of demolition or alteration.

Potential effects to the South End District have already been considered in the above discussion of the Landmark Protection Area. Thus, this section will focus on the potentially eligible properties identified in Section V.

Boston City Hospital, founded in 1861, occupies a location opposite the northwest corner of the proposed project site. Over the years BCH was constantly expanded and rebuilt, so that the present campus represents a "second generation" hospital consisting largely of medium and high rise turn-of-the-century buildings. Two of the original 1861 buildings have survived however, and are the subject of a Landmark petition. They occupy an interior position in the campus, and are totally screened from the proposed project by their later and taller neighbors.

The former Homeopathic Hospital is located opposite the northwest portion of the proposed project site. This building is oriented toward the South End and faces its back toward Albany Street. Typically, the rear elevation (S), which faces Albany Street and the proposed project site, is utilitarian in fenestration, detail, etc. Furthermore, it is separated from Albany Street by a concrete block wall, two one-story period outbuildings, and a large corrugated metal shed. Little of the historic architectural character of the building is apparent from Albany Street.

The proposed project Master Plan responds to the presence of these buildings by placing the lowest building (the 82' parking garage) in this area. It is unlikely that the proposed project will have any effect on the historic/architectural character of Boston City Hospital or the former Homeopathic Hospital.

It is unlikely that significant pre-historic or historic archaeological properties exist on the site, or will be effected by the project. Prior to the mid-19th century, the site was partially underwater, and was part of a tidal flat area. In the 1850s, the site was filled with gravel to create a surface at least 7' above the original grade. From that time until the present, the site has undergone a constant process of intensive use including building, rebuilding and demolition.

VII. Mitigation

This final section will address measures which the project proponent proposes as part of their plan to limit the project's negative effects---or provide positive effects--on historic resources. The plan is sensitive to many of the issues of building height and mass raised by the site's proximity to the South End District, and is illustrative of an approach which is generally compatible with the guidelines of the Protection Area. Some of these measures have already been touched upon in the preceding sections.

Albany Street/Harrison Avenue Protection Area Guidelines

The project adheres to the guidelines as detailed in the section on potential effects. Conformance to these guidelines is a major mitigation measure which will limit any potential negative effects of new construction within the Protection Area.

Master Plan Design Objectives

The stated design objectives of the project go well beyond the bulk issues of height and setback governed by the guidelines, to further enhance the effect of the proposed project on the adjacent South End District.

The following are among the major objectives:

- Create a strong edge and terminus to the South End neighborhood while creating an appropriate image to the city.
- Create an environment which builds upon the existing street and building fabric.

The proposed project gives definition to the southeastern edge of the South End District by reestablishing a building presence. This compatibly scaled group of buildings will act as a buffer and improve the view from the South End toward the Massachusetts Avenue Connector/Southeast Expressway. With the Suffolk County Correction Facility looming behind, this is now a major visual intrusion on the 19th century urban character of the district. The proposed project provides an appropriate design for the transitional zone of the Protection Area.

The site plan reinforces street definition by extending existing streets through the site, and by aligning the buildings with the existing street system.

The Facade Guidelines presented in the Master Plan are informed by existing turn-of-the-century institutional and warehouse buildings in the immediate project area. These are an appropriate historic design source because this corner of the South End has served institutional purposes since the land was created in the mid 19th century. The scale of these buildings also serves as an appropriate model for the proposed new construction.

Specifically, the new buildings employ the turn-of-the-century formula for high rise buildings which breaks the vertical mass into base, shaft, and cornice/penthouse. Solid end pavilions frame the design, while narrow pilasters emphasize the vertical bay division. The materials of red brick with light-colored artificial stone trim is also drawn from surrounding buildings. Consistent use of these elements is intended to unify the streetscape, and complement the South End District. (Master Plan 1991: 18)

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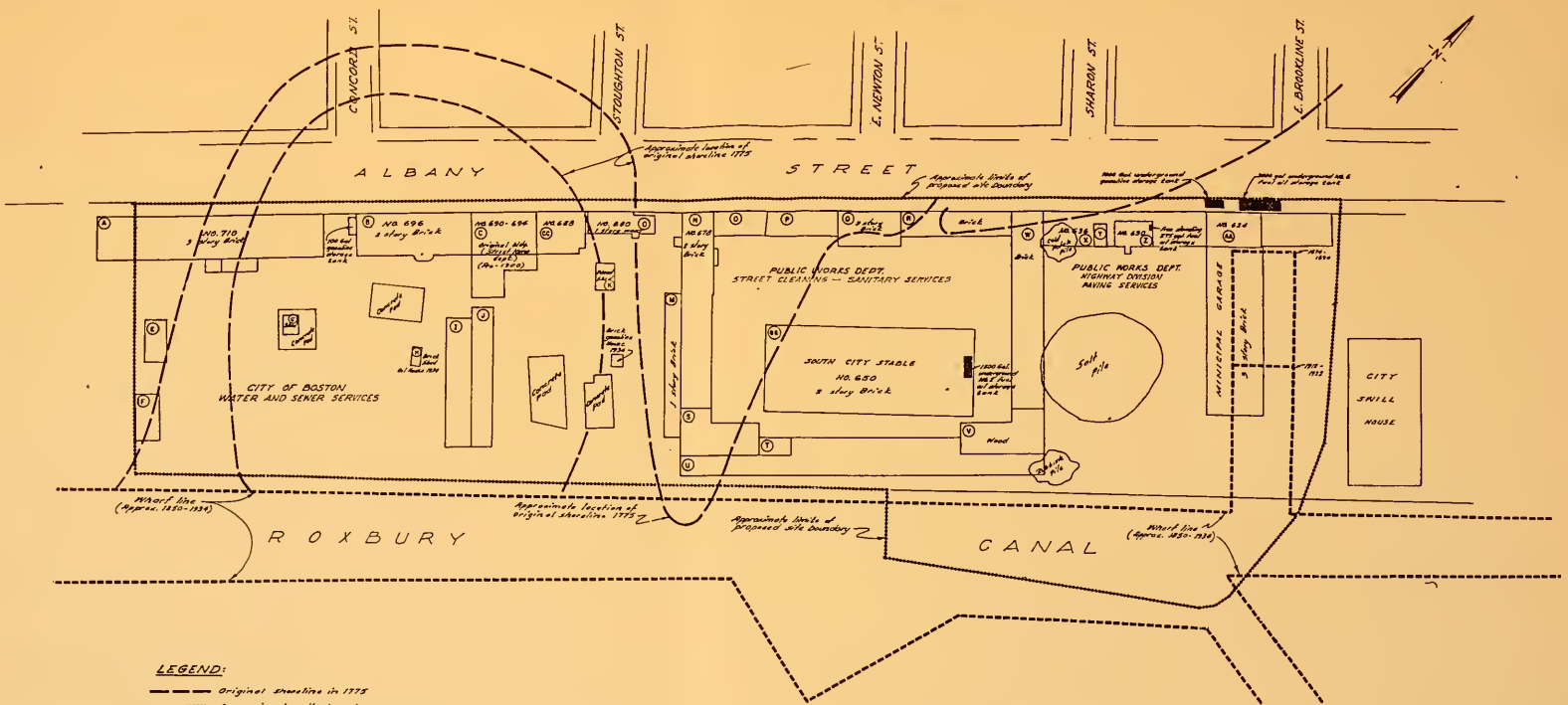


LEGEND:

- Original shoreline in 1775
- Approximate site boundary
- Wharf line from approximately 1850 thru 1934
- (A) Letter designation of building referred to in Appendix "A".

NOTE:

Base plan prepared from a plan entitled "ALBANY STREET, BOSTON PROPER", prepared by City of Boston Public Works Department - Engineering Division, Boston, Massachusetts, dated 29 July, 1972.

HALEY & ALDRICH, INC.
CAMBRIDGE, MASSACHUSETTS
CONSULTING GEOTECHNICAL ENGINEERS, GEOLOGISTS AND HYDROGEOLOGISTS

OIL AND HAZARDOUS MATERIAL SITE EVALUATION
SOUTH END TECHNOLOGY SQUARE
BOSTON, MASSACHUSETTS

HISTORICAL SITE PLAN

FIGURE 1

SCALE: AS SHOWN

FILE NO. 5807 00 E2

FIGURE 2

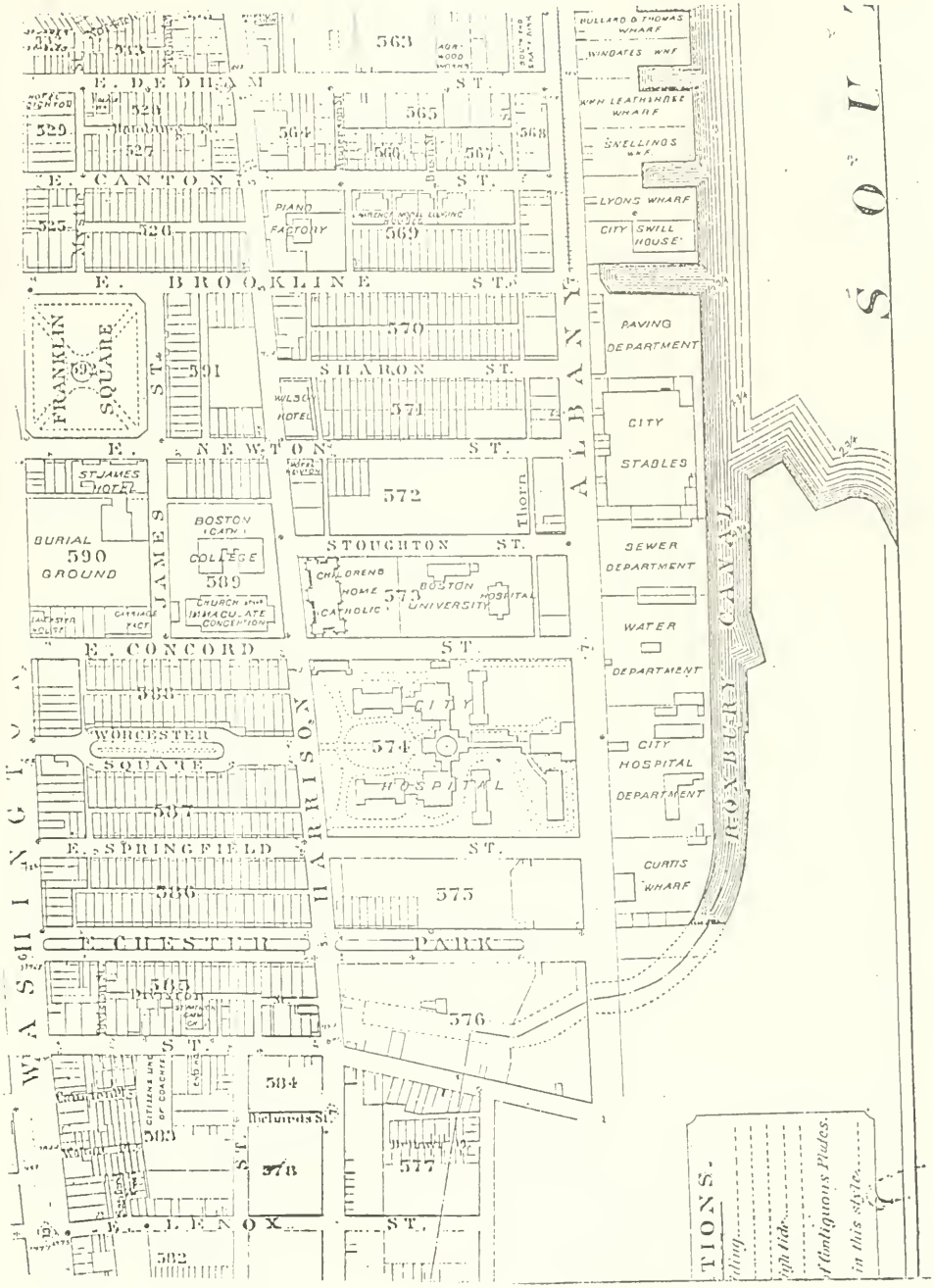


FIGURE 2

ATLAS OF THE CITY OF BOSTON

HOPKINS, 1882

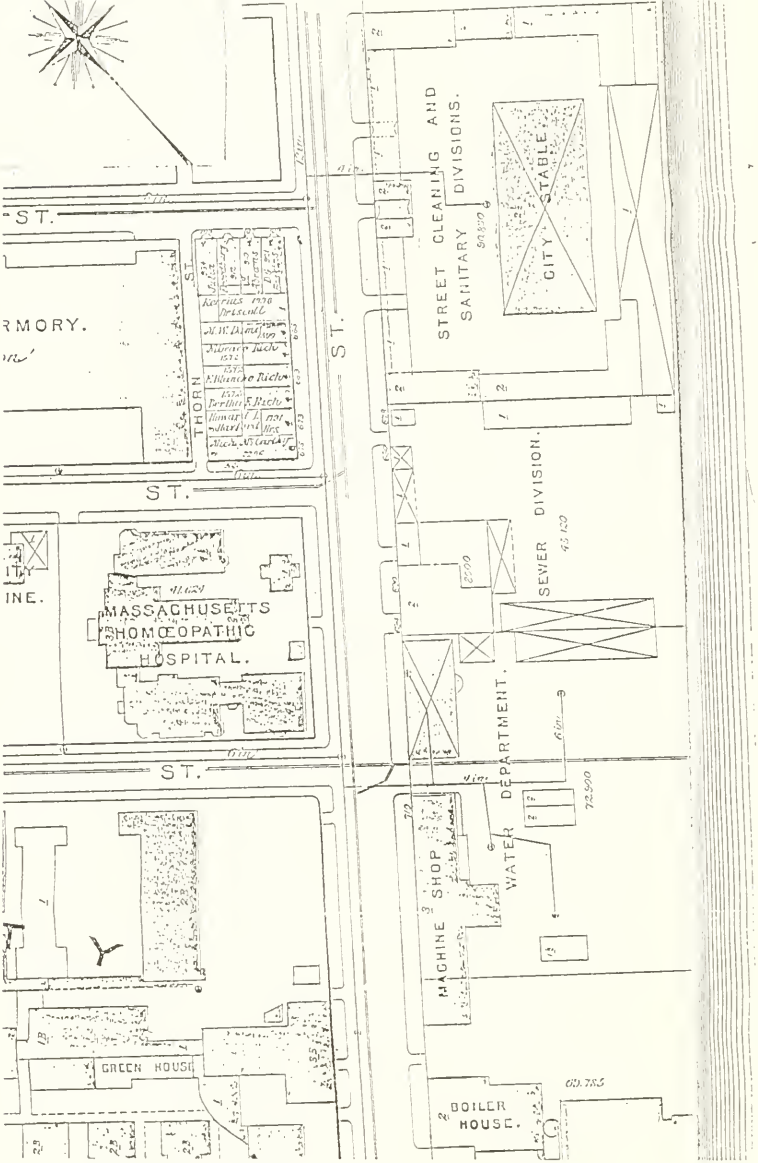


FIGURE 3

ATLAS OF BOSTON PROPER AND BACK BAY

BROMLEY, 1902

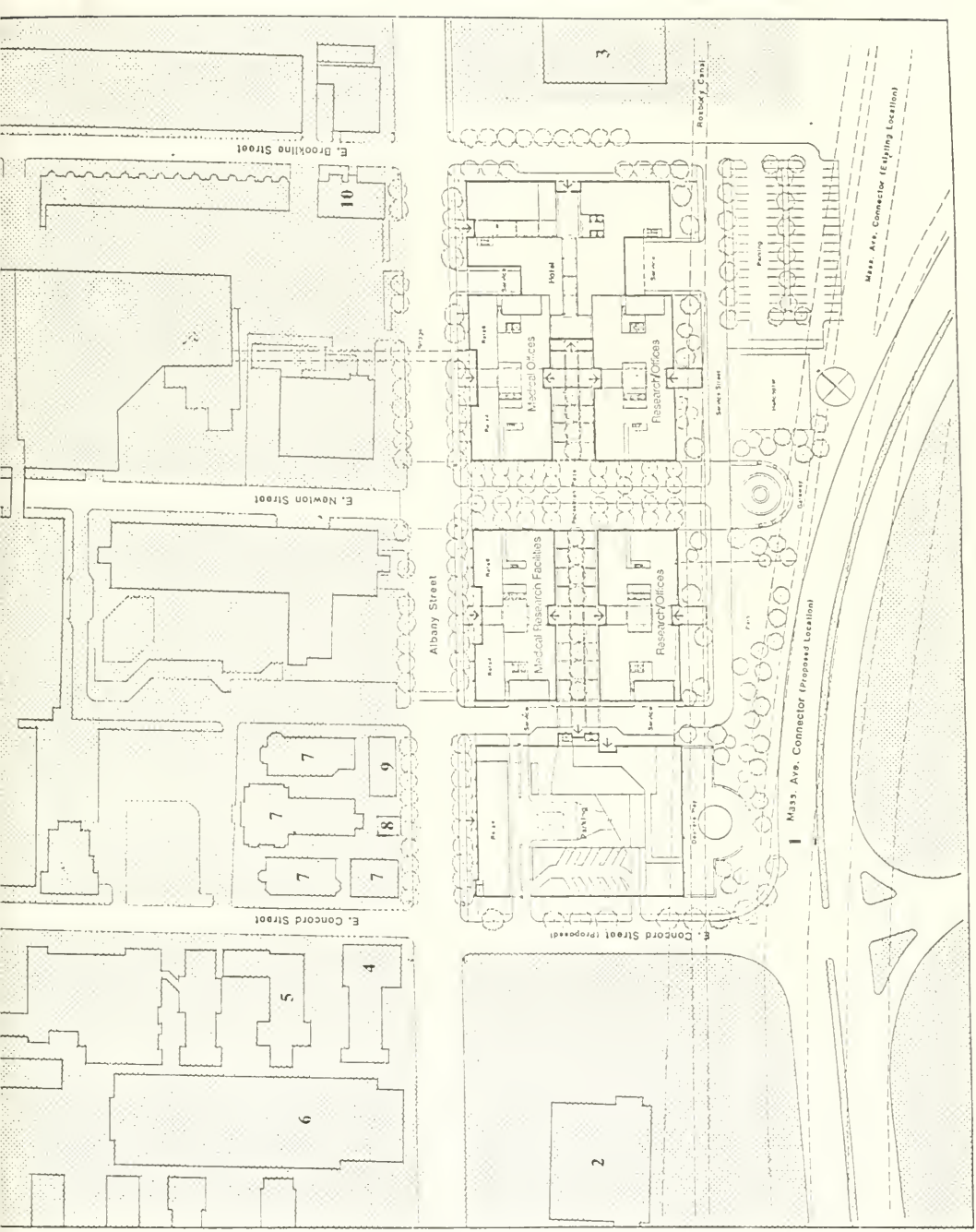


FIGURE 4

PROJECT SITE PLAN AND SURROUNDING AREA

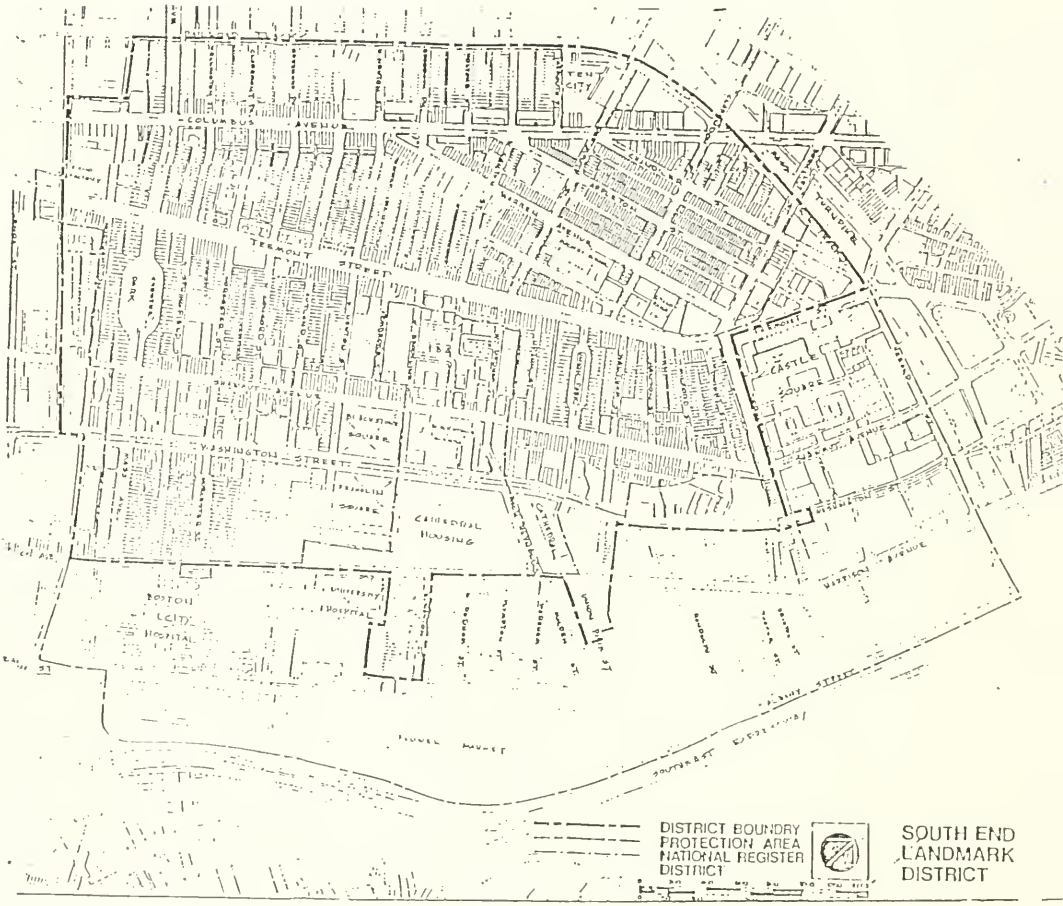
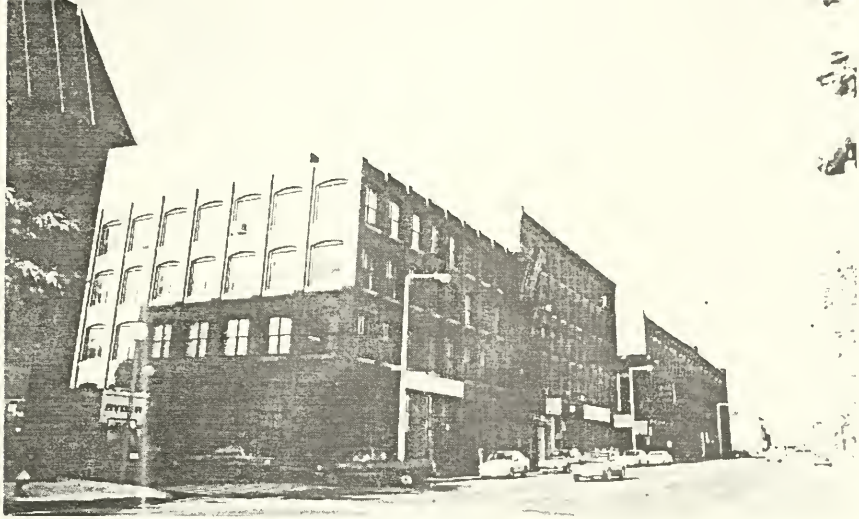


FIGURE 5

SOUTH END LANDMARK DISTRICT AND PROTECTION AREA (1983)



Warehouse Building at Albany Street

Warehouse Building at Albany Street

FIGURE 6

EXISTING HISTORICAL BUILDINGS ON ALBANY STREET

(CAMBRIDGE SEVEN ASSOCIATES, 1991)

APPENDIX F

TRANSPORTATION AND PARKING

TRANSPORTATION APPENDIX FOR:
DRAFT AND ENVIRONMENTAL IMPACT REPORT
and
TRANSPORTATION ACCESS PLAN

UNIVERSITY ASSOCIATES DEVELOPMENT
Boston, Massachusetts

Prepared for: University Associates

Prepared by: Vanasse Hangen Brustlin, Inc.
Engineers, Planners, and Scientists
101 Walnut Street
P.O. Box 9151
Watertown, Massachusetts 02272

May 1991

2825/591/
TPr-BL4

APPENDIX

A. PROJECT TRIP GENERATION

B. TRAFFIC

C. PARKING

D. PEDESTRIANS

A. PROJECT TRIP GENERATION

PROJECT: UNIVERSITY ASSOCIATES
DATE: 29-Apr-91
DESCRIPTION: REDUCED DENSITY DEVELOPMENT (NET NEW SPACE)
FILE NAME: TRIPGEN1

JOB: 2625.12
BY: SWD

TABLE ONE
PROJECTED LAND USE

	Office KSF	Retail KSF	Med. Office KSF	Restaurant Seats	Hotel Rooms	Research KSF
Size	200.000	20.000	30.000	180	250	240.000

SOURCE: DEVELOPMENT PROGRAM

TABLE TWO
PROJECTED VEHICLE TRIPS

			Office	Retail	Hotel	Restaurant	Med. Office	Research	TOTAL
Daily	Work		866	40	214	0	113	581	1,813
	Non-work		595	53	1,188	0	883	174	2,893
	TOTAL DAILY		1,461	93	1,402	0	996	755	4,706
AM	Work	In	238	2	5	0	25	74	344
	Work	Out	4	0	1	0	0	0	5
	Non-work	In	30	0	42	0	0	0	72
	Non-work	Out	3	0	48	0	0	0	51
	Total	In	268	2	47	0	0	74	391
	Total	Out	7	0	49	0	0	0	56
	TOTAL	AM	275	2	96	0	0	74	447
PM	Work	In	9	0	2	0	0	0	11
	Work	Out	236	0	6	0	0	34	278
	Non-work	In	6	3	71	0	0	0	80
	Non-work	Out	30	3	53	0	0	0	86
	Total	In	15	3	73	0	0	0	90
	Total	Out	268	3	59	0	0	34	364
	TOTAL	PM	282	6	132	0	0	34	454

SOURCE: Table 1 x Table 10

TABLE THREE
IMPAX INPUT VALUES

Zone	ADT	AM PEAK % of ADT	AM PEAK % in	PM PEAK % of ADT	PM PEAK % in
	4706	9.5%	87.4%	9.7%	19.9%

SOURCE: Table 2

INPUT

TABLE FOUR
DAILY PERSON-TRIP GENERATION RATES

USE	USER	IN	OUT	TOTAL
Office	Work	4.40	4.40	8.80
	Non-work	2.35	2.35	4.70
	Total	6.75	6.75	13.50
Retail	Work	2.00	2.00	4.00
	Non-work	50.00	50.00	100.00
	Total	52.00	52.00	104.00
Medical Office	Work	3.77	3.77	7.54
	Non-work	19.36	19.36	38.72
	Total	23.13	23.13	46.26
Research	Work	2.20	2.20	4.40
	Non-work	0.99	0.99	1.98
	Total	3.19	3.19	6.38

SOURCES: Office: Numerous downtown office TAPs
Retail: Longwood Gallaria and ITE
Medical Office: DOB office surveys: VHB, January 1991
Research: Boston Science Center EIR/ITE

INPUT

TABLE FIVE
MODE SPLIT PERCENTAGES
(Enter in decimal form)

Use	User	Percent Trips By: Auto	Transit	Walk	TOTAL
Office	Work	0.600	0.370	0.030	1.000
	Non-work	0.760	0.160	0.080	1.000
Retail	Work	0.500	0.450	0.050	1.000
	Non-work	0.050	0.000	0.950	1.000
Medical Office	Work	0.600	0.370	0.030	1.000
	Non-work	0.760	0.160	0.080	1.000
Research	Work	0.600	0.370	0.030	1.000
	Non-work	0.400	0.100	0.500	1.000

SOURCES: Office, medical office, and research work trips: ITMA surveys, 12/90
Office, medical office, and research non-work trips: MOB surveys, VHB 1/91
Retail: Longwood Galleria

TABLE SIX
PERSON TRIP GENERATION RATES BY MO

Use			Auto	Transit	Wal
Office	Work	In	2.64	1.63	0
		Out	2.64	1.63	0
	Non-work	In	1.79	0.38	0
		Out	1.79	0.38	0
Retail	Work	In	1.00	0.90	0
		Out	1.00	0.90	0
	Non-work	In	2.50	0.00	47
		Out	2.50	0.00	47
Medical Office	Work	In	2.26	1.39	0
		Out	2.26	1.39	0
	Non-work	In	14.71	3.10	1
		Out	14.71	3.10	1
Research	Work	In	1.32	0.81	0
		Out	1.32	0.81	0
	Non-work	In	0.40	0.10	0
		Out	0.40	0.10	0

SOURCE: Table 4 x Table 5

INPUT

TABLE SEVEN
PERCENTAGE OF DAILY IN AND OUT TRIPS
DURING PEAK HOURS
(Enter in decimal form)

		Work		Non-work	
		AM Peak	PM Peak	AM Peak	PM Peak
Office	In	0.550	0.020	0.100	0.020
	Out	0.010	0.550	0.010	0.100
Retail	In	0.100	0.000	0.000	0.103
	Out	0.000	0.000	0.000	0.110
Medical Office	In	0.440	0.002	0.000	0.000
	Out	0.012	0.500	0.000	0.150
Research	In	0.280	0.000	0.000	0.000
	Out	0.000	0.130	0.000	0.000

SOURCES: Office, medical office, and research trips: ITMA surveys, 12/90
Retail: Longwood Galleria

INPUT

TABLE EIGHT
VEHICLE OCCUPANCY FACTORS

Office	Work	1.22
	Non-work	1.20
Retail	Work	1.00
	Non-work	1.90
Medical Office	Work	1.20
	Non-work	1.00
Research	Work	1.20
	Non-work	1.20

SOURCES: Same as Table 7

TABLE NINE
PEAK HOUR PERSON-TRIP RATES

			Auto		Transit		Walk	
			AM	PM	AM	PM	AM	PM
Office	Work	In	1.45	0.05	0.90	0.03	0.07	0.00
		Out	0.03	1.45	0.02	0.90	0.00	0.07
	Non-Work	In	0.18	0.04	0.04	0.01	0.02	0.00
		Out	0.02	0.18	0.00	0.04	0.00	0.02
Retail	Work	In	0.10	0.00	0.09	0.00	0.01	0.00
		Out	0.00	0.00	0.00	0.00	0.00	0.00
	Non-Work	In	0.00	0.26	0.00	0.00	0.00	4.89
		Out	0.00	0.28	0.00	0.00	0.00	5.23
Medical Office	Work	In	1.00	0.00	0.61	0.00	0.05	0.00
		Out	0.03	1.13	0.02	0.70	0.00	0.06
	Non-Work	In	0.00	0.00	0.00	0.00	0.00	0.00
		Out	0.00	2.21	0.00	0.46	0.00	0.23
Research	Work	In	0.37	0.00	0.23	0.00	0.02	0.00
		Out	0.00	0.17	0.00	0.11	0.00	0.01
	Non-work	In	0.00	0.00	0.00	0.00	0.00	0.00
		Out	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Table 6 x Table 7

INPUT

TABLE TEN
VEHICLE-TRIP RATES

			Office	Retail	Med. Office	Restaurant	Hotel	Research
Daily	Work		4.33	2.00	3.77	0.00	0.00	2.42
	Non-work		2.98	2.63	29.43	0.00	0.00	0.73
	TOTAL DAILY		7.30	4.63	33.20	0.00	0.00	3.15
AM	Work	In	1.19	0.10	0.83	0.00	0.00	0.31
	Work	Out	0.02	0.00	0.02	0.00	0.00	0.00
	Non-work	In	0.15	0.00	0.00	0.00	0.00	0.00
	Non-work	Out	0.01	0.00	0.00	0.00	0.00	0.00
	Total	In	1.34	0.10	0.83	0.00	0.00	0.31
	Total	Out	0.04	0.00	0.02	0.00	0.00	0.00
	TOTAL	AM	1.38	0.10	0.85	0.00	0.00	0.31
PM	Work	In	0.04	0.00	0.00	0.00	0.00	0.00
	Work	Out	1.19	0.00	0.94	0.00	0.00	0.14
	Non-work	In	0.03	0.14	0.00	0.00	0.00	0.00
	Non-work	Out	0.15	0.14	2.21	0.00	0.00	0.00
	Total	In	0.07	0.14	0.00	0.00	0.00	0.00
	Total	Out	1.34	0.14	3.15	0.00	0.00	0.14
	TOTAL	PM	1.41	0.28	3.15	0.00	0.00	0.14

NOTE: Rates in this table are calculated by dividing the appropriate rates in Tables 6 and 9 by the factors in Table 8 or they may be entered directly.

sources: Hotel rate from Piers EIR

TABLE ELEVEN
TRANSIT TRIPS

			Office	Retail	Med. Office	Restaurant	Hotel	Research	TOTAL
Daily	Work		651	36	84	0	185	391	1,347
	Non-work		150	0	186	0	149	48	533
	Total		802	36	270	0	334	438	1,879
AM	Work	In	179	2	18	0	5	55	259
	Work	Out	3	0	1	0	1	0	5
	Non-work	In	8	0	0	0	5	0	13
	Non-work	Out	1	0	0	0	6	0	7
	Total	In	187	2	18	0	10	55	272
	Total	Out	4	0	1	0	7	0	12
PM	Work	In	7	0	0	0	2	0	9
	Work	Out	179	0	21	0	6	25	231
	Non-work	In	2	0	0	0	9	0	11
	Non-work	Out	8	0	14	0	7	0	29
	Total	In	8	0	0	0	11	0	19
	Total	Out	187	0	35	0	13	25	260

SOURCE: Daily - Table 6 x Table 1
Peak - Table 9 x Table 1

NOTE: Hotel trips must be entered directly to be included in project totals.

TABLE TWELVE
WALK TRIPS

			Office	Retail	Med. Office	Restaurant	Hotel	Research	TOTAL
Daily	Work		53	4	7	0	15	32	110
	Non-work		75	1,900	93	0	1,040	238	3,346
	Total		128	1,904	100	0	1,055	269	3,456
AM	Work	In	15	0	1	0	0	4	21
	Work	Out	0	0	0	0	0	0	0
	Non-work	In	4	0	0	0	36	0	40
	Non-work	Out	0	0	0	0	42	0	42
	Total	In	18	0	1	0	36	4	60
	Total	Out	1	0	0	0	42	0	43
PM	Work	In	1	0	0	0	0	0	1
	Work	Out	15	0	2	0	0	2	18
	Non-work	In	1	98	0	0	62	0	161
	Non-work	Out	4	105	7	0	47	0	162
	Total	In	1	98	0	0	62	0	161
	Total	Out	18	105	9	0	47	2	181

SOURCE: Daily - Table 6 x Table 1
Peak - Table 9 x Table 1

NOTE: Hotel must be entered directly to be included in project totals.

PROJECT: UNIVERSITY ASSOCIATES
DATE: 05-Feb-91
DESCRIPTION: HOTEL TRIP GENERATION - 2000
FILE NAME: HOTTRGN

JOB: 2625.12
BY: SWD

TABLE ONE
PROJECTED LAND USE

	Hotel Rooms	Retail KSF	Med. Office KSF	Restaurant Seats	Office KSF	Research KSF
Size	250	0	0	0	0	0

SOURCE: DEVELOPMENT PROGRAM

TABLE TWO
PROJECTED VEHICLE TRIPS

			Hotel	Retail	Office	Restaurant	Med. Office	Research	TOTAL
Daily	Work		214	0	0	0	0	0	214
	Non-work		1,188	0	0	0	0	0	1,188
	TOTAL DAILY		1,402	0	0	0	0	0	1,402
AM	Work	In	5	0	0	0	0	0	5
	Work	Out	1	0	0	0	0	0	1
	Non-work	In	42	0	0	0	0	0	42
	Non-work	Out	48	0	0	0	0	0	48
	Total	In	47	0	0	0	0	0	47
	Total	Out	49	0	0	0	0	0	49
	TOTAL	AM	96	0	0	0	0	0	96
PM	Work	In	2	0	0	0	0	0	2
	Work	Out	6	0	0	0	0	0	6
	Non-work	In	71	0	0	0	0	0	71
	Non-work	Out	53	0	0	0	0	0	53
	Total	In	73	0	0	0	0	0	73
	Total	Out	60	0	0	0	0	0	60
	TOTAL	PM	133	0	0	0	0	0	133

SOURCE: Table 1 x Table 10

TABLE THREE
IMPAX INPUT VALUES

Zone	ADT	AM PEAK % of ADT	AM PEAK % in	PM PEAK % of ADT	PM PEAK % in
	1402	6.8%	49.1%	9.5%	55.1%

SOURCE: Table 2

INPUT

TABLE FOUR

DAILY PERSON-TRIP GENERATION RATES

USE	USER	IN	OUT	TOTAL
Hotel	Work	1.00	1.00	2.00
	Non-work	5.94	5.94	11.88
	Total	6.94	6.94	13.88
Retail	Work	0.00	0.00	0.00
	Non-work	0.00	0.00	0.00
	Total	0.00	0.00	0.00
Medical Office	Work	0.00	0.00	0.00
	Non-work	0.00	0.00	0.00
	Total	0.00	0.00	0.00
Research	Work	0.00	0.00	0.00
	Non-work	0.00	0.00	0.00
	Total	0.00	0.00	0.00

SOURCES: Hotel: Fiers EIR, Vanasse Hangen Brustlin, Inc.

INPUT

TABLE FIVE

MODE SPLIT PERCENTAGES

(Enter in decimal form)

		Percent Trips By			
Use	User	Auto	Transit	Walk	TOTAL
Hotel	Work	0.600	0.370	0.030	1.000
	Non-work	0.600	0.050	0.350	1.000
Retail	Work	0.000	0.000	0.000	0.000
	Non-work	0.000	0.000	0.000	0.000
Medical Office	Work	0.000	0.000	0.000	0.000
	Non-work	0.000	0.000	0.000	0.000
Research	Work	0.000	0.000	0.000	0.000
	Non-work	0.000	0.000	0.000	0.000

SOURCES: Hotel: South End Surveys and estimations

TABLE SIX

PERSON TRIP GENERATION RATES BY MODE

Use			Auto	Transit	Walk
Hotel	Work	In	0.60	0.37	0.03
		Out	0.60	0.37	0.03
	Non-work	In	3.56	0.30	2.08
		Out	3.56	0.30	2.08
Retail	Work	In	0.00	0.00	0.00
		Out	0.00	0.00	0.00
	Non-work	In	0.00	0.00	0.00
		Out	0.00	0.00	0.00
Medical Office	Work	In	0.00	0.00	0.00
		Out	0.00	0.00	0.00
	Non-work	In	0.00	0.00	0.00
		Out	0.00	0.00	0.00
Research	Work	In	0.00	0.00	0.00
		Out	0.00	0.00	0.00
	Non-work	In	0.00	0.00	0.00
		Out	0.00	0.00	0.00

SOURCE: Table 4 x Table 5

INPUT

TABLE SEVEN
PERCENTAGE OF DAILY IN AND OUT TRIPS
DURING PEAK HOURS
(Enter in decimal form)

		Work		Non-work	
		AM Peak	PM Peak	AM Peak	PM Peak
Hotel	In	0.050	0.020	0.070	0.120
	Out	0.010	0.060	0.080	0.090
Retail	In	0.000	0.000	0.000	0.000
	Out	0.000	0.000	0.000	0.000
Medical Office	In	0.000	0.000	0.000	0.000
	Out	0.000	0.000	0.000	0.000
Research	In	0.000	0.000	0.000	0.000
	Out	0.000	0.000	0.000	0.000

SOURCES: Hotel: Piers EIR

INPUT

TABLE EIGHT
VEHICLE OCCUPANCY FACTORS

Hotel	Work	1.40
	Non-work	1.50
Retail	Work	0.00
	Non-work	0.00
Medical Office	Work	0.00
	Non-work	0.00
Research	Work	0.00
	Non-work	0.00

SOURCES: Hotel: Piers EIR

TABLE NINE
PEAK HOUR PERSON-TRIP RATES

			Auto		Transit		Walk	
			AM	PM	AM	PM	AM	PM
Hotel	Work	In	0.03	0.01	0.02	0.01	0.00	0.00
		Out	0.01	0.04	0.00	0.02	0.00	0.00
	Non-Work	In	0.25	0.43	0.02	0.04	0.15	0.25
		Out	0.29	0.32	0.02	0.03	0.17	0.19
Retail	Work	In	0.00	0.00	0.00	0.00	0.00	0.00
		Out	0.00	0.00	0.00	0.00	0.00	0.00
	Non-Work	In	0.00	0.00	0.00	0.00	0.00	0.00
		Out	0.00	0.00	0.00	0.00	0.00	0.00
Medical Office	Work	In	0.00	0.00	0.00	0.00	0.00	0.00
		Out	0.00	0.00	0.00	0.00	0.00	0.00
	Non-Work	In	0.00	0.00	0.00	0.00	0.00	0.00
		Out	0.00	0.00	0.00	0.00	0.00	0.00
Research	Work	In	0.00	0.00	0.00	0.00	0.00	0.00
		Out	0.00	0.00	0.00	0.00	0.00	0.00
	Non-work	In	0.00	0.00	0.00	0.00	0.00	0.00
		Out	0.00	0.00	0.00	0.00	0.00	0.00

SOURCE: Table 6 x Table 7

INPUT

TABLE TEN

VEHICLE-TRIP RATES

			Hotel	Retail	Med. Office	Restaurant	Office	Research
Daily	Work		0.86	0.00	0.00	0.00	0.00	0.00
	Non-work		4.75	0.00	0.00	0.00	0.00	0.00
	TOTAL DAILY		5.61	0.00	0.00	0.00	0.00	0.00
AM	Work	In	0.02	0.00	0.00	0.00	0.00	0.00
	Work	Out	0.00	0.00	0.00	0.00	0.00	0.00
	Non-work	In	0.17	0.00	0.00	0.00	0.00	0.00
	Non-work	Out	0.19	0.00	0.00	0.00	0.00	0.00
	Total	In	0.19	0.00	0.00	0.00	0.00	0.00
	Total	Out	0.19	0.00	0.00	0.00	0.00	0.00
	TOTAL	AM	0.38	0.00	0.00	0.00	0.00	0.00
PM	Work	In	0.01	0.00	0.00	0.00	0.00	0.00
	Work	Out	0.03	0.00	0.00	0.00	0.00	0.00
	Non-work	In	0.29	0.00	0.00	0.00	0.00	0.00
	Non-work	Out	0.21	0.00	0.00	0.00	0.00	0.00
	Total	In	0.29	0.00	0.00	0.00	0.00	0.00
	Total	Out	0.24	0.00	0.00	0.00	0.00	0.00
	TOTAL	PM	0.53	0.00	0.00	0.00	0.00	0.00

NOTE: Rates in this table are calculated by dividing the appropriate rates in Tables 6 and 9 by the factors in Table 8 or they may be entered directly.

sources: Hotel rate from Piers EIR

TABLE ELEVEN
TRANSIT TRIPS

			Hotel	Retail	Med. Office	Restaurant	Office	Research	TOTAL
Daily	Work		185	0	0	0	0	0	185
	Non-work		149	0	0	0	0	0	149
	Total		334	0	0	0	0	0	334
AM	Work	In	5	0	0	0	0	0	5
	Work	Out	1	0	0	0	0	0	1
	Non-work	In	5	0	0	0	0	0	5
	Non-work	Out	6	0	0	0	0	0	6
	Total	In	10	0	0	0	0	0	10
	Total	Out	7	0	0	0	0	0	7
PM	Work	In	2	0	0	0	0	0	2
	Work	Out	6	0	0	0	0	0	6
	Non-work	In	9	0	0	0	0	0	9
	Non-work	Out	7	0	0	0	0	0	7
	Total	In	11	0	0	0	0	0	11
	Total	Out	12	0	0	0	0	0	12

SOURCE: Daily - Table 6 x Table 1
Paex - Table 9 x Table 1

NOTE: Restaurant and Hotel trips must be entered directly to be included in project totals.

TABLE TWELVE
WALK TRIPS

			Hotel	Retail	Med. Office	Restaurant	Office	Research	TOTAL
Daily	Work		15	0	0	0	0	0	15
	Non-work		1,040	0	0	0	0	0	1,040
	Total		1,055	0	0	0	0	0	1,055
AM	Work	In	0	0	0	0	0	0	0
	Work	Out	0	0	0	0	0	0	0
	Non-work	In	36	0	0	0	0	0	36
	Non-work	Out	42	0	0	0	0	0	42
	Total	In	37	0	0	0	0	0	37
	Total	Out	42	0	0	0	0	0	42
PM	Work	In	0	0	0	0	0	0	0
	Work	Out	0	0	0	0	0	0	0
	Non-work	In	62	0	0	0	0	0	62
	Non-work	Out	47	0	0	0	0	0	47
	Total	In	63	0	0	0	0	0	63
	Total	Out	47	0	0	0	0	0	47

SOURCE: Daily - Table 6 x Table 1
Paex - Table 9 x Table 1

NOTE: Restaurant and Hotel must be entered directly to be included in project totals.

Table A-1 UNADJUSTED ITE VEHICLE-TRIP GENERATION RATES*

	Medical Office**	Research***	General Office	Hotel+	Restaurant	Retail
Daily						
DAILY	34.17	6.09	10.42	8.70	2.86	94.71
Morning Peak Hour						
In	0.91	1.13	1.50	0.47	N/A	1.62
Out	0.72	0.11	0.22	0.23	N/A	0.69
TOTAL MORNING	1.63	1.24	1.72	0.70	0.03	2.31
Evening Peak Hour						
In	0.98	0.15	0.26	0.36	N/A	4.26
Out	2.65	0.85	1.37	0.30	N/A	4.43
TOTAL EVENING	3.63	1.00	1.63	0.66	0.22	8.69

Source: Trip Generation, Fourth Edition; Institute of Transportation Engineers (1987).
* Vehicle trips per 1,000 square feet.
** ITE code number 720.
*** ITE code number 760.
\+ ITE code number 310.

B. TRAFFIC

Automatic Traffic Recorders:

Location Number	Description
1	Massachusetts Avenue Between Albany Street and Harrison Avenue (1990)
2	Albany Street north of East Concord Street (1988 and 1990)
3	Melnea Cass Boulevard south of Massachusetts Avenue (1988 and 1990)
4	Albany Street north of East Canton Street (1988)
5	Albany Street north of Union Park Street (1988)
6	Massachusetts Avenue Connector On-Ramps (1988)
7	Massachusetts Avenue Connector Off-Ramps (1988)

SITE CODE : [illegible] [illegible] TWEEK. TWEEK. GRUB [illegible] PAGE: 1

Location : MASS.AVE.EST.ALBANY/BRAINTREE WESTBOUND FILE: [illegible]

City,State: BOSTON,MA.

Operator : [illegible] DATE: 12/[illegible]/9[illegible]

TIME BEGIN	MONDAY 3	TUESDAY 4	WEDNESDAY 5	THURSDAY 6	FRIDAY 7	WEEKDAY AVERAGE	SATURDAY 8	SUNDAY 9	WEEK AVERAGE
12:00 AM	*	*	*	25	0	13	518	598	285
1:00	*	*	*	0	0	0	442	480	230
2:00	*	*	*	0	0	0	419	490	227
3:00	*	*	*	0	0	0	191	199	97
4:00	*	*	*	0	0	0	110	47	39
5:00	*	*	*	0	0	0	131	0	32
6:00	*	*	*	0	0	0	193	0	48
7:00	*	*	*	0	685	343	375	0	273
8:00	*	*	*	0	913	456	449	0	340
9:00	*	*	*	0	816	408	549	0	341
10:00	*	*	588	157	735	496	619	0	421
11:00	*	*	640	773	775	730	720	0	582
12:00 PM	*	*	832	873	941	852	784	0	666
1:00	*	*	760	839	920	839	733	0	650
2:00	*	*	666	872	969	815	750	0	640
3:00	*	*	721	974	1018	904	771	0	696
4:00	*	*	820	997	941	919	715	0	694
5:00	*	*	1003	1007	968	992	738	0	743
6:00	*	*	852	888	877	872	660	0	659
7:00	*	*	694	744	754	727	591	0	554
8:00	*	*	724	797	680	697	541	0	526
9:00	*	*	771	677	591	655	545	0	520
10:00	*	*	736	712	728	725	727	0	589
11:00	*	*	507	374	705	528	670	0	455
TOTALS	*	*	10304	10652	13940	12033	13005	1814	10316
% AVG WKDAY	*	*	85.6	88.5	115.8				
% AVG DAY	*	*	99.9	103.3	135.1		126.1	17.6	
AM PEAK HR	*	*	11:00	11:00	8:00	11:00	11:00	12:00	11:00
VOLUME	*	*	640	773	913	730	720	598	582
PM PEAK HR	*	*	5:00	5:00	3:00	5:00	12:00	12:00	5:00
VOLUME	*	*	1003	1007	1018	992	784	0	743

SITE CODE: [illegible] VARIABLE, HANDEN, [illegible] PAGE: 1

Location : MASS.AVE.BET.ALBANY/HARRISON EASTBOUND FILE: BOSTON8

City,State: BOSTON,MA.

Operator : VAN/SIM DATE: 12/02/90

TIME BEGIN	MONDAY 3	TUESDAY 4	WEDNESDAY 5	THURSDAY 6	FRIDAY 7	WEEKDAY AVERAGE	SATURDAY 8	SUNDAY 9	WEEK AVERAGE
12:00 AM	*	*	*	5	3	4	0	0	2
1:00	*	*	*	0	4	2	0	2	1
2:00	*	*	*	1	0	0	0	0	0
3:00	*	*	*	0	0	0	0	0	0
4:00	*	*	*	0	0	0	0	0	0
5:00	*	*	*	0	0	0	0	0	0
6:00	*	*	*	0	0	0	0	0	0
7:00	*	*	*	0	0	0	0	0	0
8:00	*	*	*	0	1	0	0	0	0
9:00	*	*	*	0	0	0	0	0	0
10:00	*	*	*	477	1	239	0	0	119
11:00	*	*	1070	1026	0	678	0	0	419
12:00 PM	*	*	1087	621	0	569	0	0	341
1:00	*	*	954	841	0	598	0	0	359
2:00	*	*	937	865	0	600	0	0	360
3:00	*	*	1026	1046	0	690	0	0	414
4:00	*	*	1093	1020	0	704	0	0	422
5:00	*	*	1182	1138	0	773	0	0	464
6:00	*	*	873	911	0	594	0	0	356
7:00	*	*	686	694	0	453	0	0	272
8:00	*	*	499	603	0	367	0	0	220
9:00	*	*	449	910	0	453	0	0	271
10:00	*	*	431	792	0	407	0	0	244
11:00	*	*	389	241	0	183	0	0	110
TOTALS	*	*	10575	11191	9	7334	0	2	4374
% AVG WKDAY	*	*	144.2	152.6	0.1				
% AVG DAY	*	*	241.5	255.9	0.2		0	0.0	
AM PEAK HR	*	*	11:00	11:00	1:00	11:00	12:00	1:00	11:00
VOLUME	*	*	1070	1026	4	698	0	2	419
PM PEAK HR	*	*	5:00	5:00	12:00	5:00	12:00	12:00	5:00
VOLUME	*	*	1182	1138	0	773	0	0	464

SITE CODE : 00102512 PHASE. HANSEN. BRISTLIN PAGE: 1

Location : ALBANY W.OF E.CONCORD (SOUTH of E. NEWTON) FILE: BOSTONI

City.State: BOSTON.MA.

Operator : VAN/JIM DATE: 12/03/90

TIME BEGIN	MONDAY 3 Ch 1	Ch 2	TUESDAY 4 Ch 1	Ch 2	WEDNESDAY 5 Ch 1	Ch 2	THURSDAY 6 Ch 1	Ch 2	FRIDAY 7 Ch 1	Ch 2	SATURDAY 8 Ch 1	Ch 2	SUNDAY 9 Ch 1	Ch 2	WEEK AVERAGE Ch 1	Ch 2
12:00 AM	*	*	*	*	*	*	51	67	69	79	107	91	0	0	56	59
1:00	*	*	*	*	*	*	13	36	30	31	2	4	0	0	11	17
2:00	*	*	*	*	*	*	6	3	0	0	0	0	0	0	1	0
3:00	*	*	*	*	*	*	0	0	0	0	0	0	0	0	0	0
4:00	*	*	*	*	*	*	0	0	0	0	0	0	0	0	0	0
5:00	*	*	*	*	*	*	0	0	0	0	0	0	0	0	0	0
6:00	*	*	*	*	*	*	0	0	0	0	0	0	0	0	0	0
7:00	*	*	*	*	*	*	0	0	489	111	0	0	0	0	122	27
8:00	*	*	*	*	*	*	0	0	1005	267	0	0	0	0	251	66
9:00	*	*	*	*	*	*	0	0	727	267	0	0	0	0	181	66
10:00	*	*	*	*	569	307	407	212	532	349	0	0	0	0	301	173
11:00	*	*	*	*	569	273	628	354	563	345	0	0	0	0	352	194
12:00 PM	*	*	*	*	663	362	592	343	555	367	0	0	0	0	367	214
1:00	*	*	*	*	560	329	505	330	516	319	0	0	0	0	326	195
2:00	*	*	*	*	634	400	672	354	500	335	0	0	0	0	361	218
3:00	*	*	*	*	667	415	734	454	743	484	0	0	0	0	428	270
4:00	*	*	*	*	591	538	584	552	631	575	0	0	0	0	361	333
5:00	*	*	*	*	495	516	502	541	505	523	0	0	0	0	306	318
6:00	*	*	*	*	355	261	382	323	408	290	0	0	0	0	229	172
7:00	*	*	*	*	277	192	265	203	256	213	0	0	0	0	159	121
8:00	*	*	*	*	187	209	216	193	190	143	0	0	0	0	114	109
9:00	*	*	*	*	150	140	300	117	189	123	0	0	0	0	127	76
10:00	*	*	*	*	143	141	282	136	286	118	0	0	0	0	142	79
11:00	*	*	*	*	105	180	170	126	241	155	0	0	0	0	103	92
TOTALS	*	*	*	*	5973	4273	6339	4344	8465	5087	109	95	0	0	4294	2799

COMBINED TOTALS

12:00 AM	*	*	118	145	198	0	115
1:00	*	*	49	61	6	0	29
2:00	*	*	9	0	0	0	1
3:00	*	*	0	0	0	0	0
4:00	*	*	0	0	0	0	0
5:00	*	*	0	0	0	0	0
6:00	*	*	0	0	0	0	0
7:00	*	*	0	600	0	0	149
8:00	*	*	0	1272	0	0	317
9:00	*	*	0	994	0	0	247
10:00	*	*	876	619	881	0	474
11:00	*	*	842	952	908	0	546
12:00 PM	*	*	1030	935	922	0	577
1:00	*	*	909	865	835	0	521
2:00	*	*	1034	1026	836	0	579
3:00	*	*	1082	1188	1227	0	698
4:00	*	*	1129	1136	1206	0	694
5:00	*	*	1021	1043	1059	0	624
6:00	*	*	619	705	688	0	401
7:00	*	*	469	468	469	0	280
8:00	*	*	376	409	333	0	223
9:00	*	*	290	417	312	0	203
10:00	*	*	284	418	404	0	221
11:00	*	*	285	296	396	0	195
TOTALS	*	*	10246	10680	13552	204	7093

(2)

VANNASSEE/HANSEN/BRUSTLIN
HOURLY, 2 CHANNEL VEHICLE COUNT
CORRECTION FACTOR: 1.00

REFERENCE: 2177
LOCATION : ALBANY ST S OF E NEWTON ST BOSTON, MA.
WEATHER : (North of E. Concord)
OPERATOR : VAN/THB/BS

FILENAME: LOGSCITT
WEEK OF MONDAY 6 / 20 / 88

HOUR BEGINS	MONDAY 20 N	MONDAY 20 S	TUESDAY 21 N	TUESDAY 21 S	WEDNESDAY 22 N	WEDNESDAY 22 S	THURSDAY 23 N	THURSDAY 23 S	FRIDAY 24 N	FRIDAY 24 S	SATURDAY 25 N	SATURDAY 25 S	SUNDAY 26 N	SUNDAY 26 S	WEEKDAY AVER N
12 AM	:	:	69	108	81	142	:	:	:	:	:	:	:	:	75
1	:	:	38	26	48	44	:	:	:	:	:	:	:	:	43
2	:	:	32	26	28	33	:	:	:	:	:	:	:	:	30
3	:	:	27	16	26	17	:	:	:	:	:	:	:	:	27
4	:	:	55	23	5	3	:	:	:	:	:	:	:	:	30
5	:	:	168	52	0	0	:	:	:	:	:	:	:	:	84
6	:	:	600	160	0	2	:	:	:	:	:	:	:	:	300
7	:	:	754	285	0	0	:	:	:	:	:	:	:	:	377
8	:	:	800	262	0	0	:	:	:	:	:	:	:	:	400
9	:	:	664	284	0	0	:	:	:	:	:	:	:	:	332
10	:	:	529	275	:	:	:	:	:	:	:	:	:	:	529
11	:	:	577	338	:	:	:	:	:	:	:	:	:	:	577
12 PM	:	:	550	243	:	:	:	:	:	:	:	:	:	:	550
1	467	292	524	314	:	:	:	:	:	:	:	:	:	:	496
2	542	340	522	311	:	:	:	:	:	:	:	:	:	:	532
3	628	411	624	583	:	:	:	:	:	:	:	:	:	:	626
4	529	641	563	607	:	:	:	:	:	:	:	:	:	:	546
5	498	552	268	740	:	:	:	:	:	:	:	:	:	:	383
6	327	290	0	575	:	:	:	:	:	:	:	:	:	:	164
7	268	180	0	452	:	:	:	:	:	:	:	:	:	:	134
8	194	165	0	405	:	:	:	:	:	:	:	:	:	:	97
9	165	140	0	297	:	:	:	:	:	:	:	:	:	:	83
10	202	239	16	361	:	:	:	:	:	:	:	:	:	:	109
11	140	324	134	320	:	:	:	:	:	:	:	:	:	:	137
TOTALS	3960	3574	7514	7168	188	241	:	:	:	:	:	:	:	:	6661

COMBINED TOTALS

12	:	177	223	:	:	:	:	200
1	:	64	92	:	:	:	:	78
2	:	58	61	:	:	:	:	60
3	:	43	43	:	:	:	:	44
4	:	83	8	:	:	:	:	46
5	:	220	0	:	:	:	:	110
6	:	760	2	:	:	:	:	381
7	:	1039	0	:	:	:	:	520
8	:	1062	0	:	:	:	:	531
9	:	948	0	:	:	:	:	474
10	:	804	:	:	:	:	:	804
11	:	915	:	:	:	:	:	915
12	:	893	:	:	:	:	:	893
1	759	838	:	:	:	:	:	799
2	882	833	:	:	:	:	:	858
3	1039	1207	:	:	:	:	:	1123
4	1170	1170	:	:	:	:	:	1170
5	1050	1008	:	:	:	:	:	1029
6	617	575	:	:	:	:	:	597
7	448	452	:	:	:	:	:	450
8	359	405	:	:	:	:	:	382
9	305	297	:	:	:	:	:	302
10	441	377	:	:	:	:	:	409
11	464	454	:	:	:	:	:	459
TOTALS	7534	14682	428	:	:	:	:	12634

(3)

MASSACHUSETTS/MASSENVIRONMENTAL
HOURLY, 2 CHANNEL VEHICLE COUNT

REFERENCE: 2177 CORRECTION FACTOR: 1.00

LOCATION : MELNEA CASS BLVD @ OF MASS AVE BOSTON, MA. FILENAME: MELNEA

WEATHER :

OPERATOR : MDW/BB/BSH

HOUR BEGINS	MONDAY 20 N	MONDAY 20 S	TUESDAY 21 N	TUESDAY 21 S	WEDNESDAY 22 N	WEDNESDAY 22 S	THURSDAY 23 N	THURSDAY 23 S	FRIDAY 24 N	FRIDAY 24 S	SATURDAY 25 N	SATURDAY 25 S	SUNDAY 26 N	SUNDAY 26 S	WEEKDAY AVER- N
12 AM	*	*	220	4	252	200	*	*	*	*	*	*	*	*	226
1	*	*	122	1	155	147	*	*	*	*	*	*	*	*	144
2	*	*	98	0	91	80	*	*	*	*	*	*	*	*	95
3	*	*	90	0	77	77	*	*	*	*	*	*	*	*	84
4	*	*	108	0	142	73	*	*	*	*	*	*	*	*	125
5	*	*	327	122	322	327	*	*	*	*	*	*	*	*	325
6	*	*	710	975	732	938	*	*	*	*	*	*	*	*	723
7	*	*	862	1071	566	931	*	*	*	*	*	*	*	*	714
8	*	*	872	998	0	37	*	*	*	*	*	*	*	*	436
9	*	*	826	910	*	*	*	*	*	*	*	*	*	*	826
10	*	*	823	783	*	*	*	*	*	*	*	*	*	*	823
11	850	822	819	801	*	*	*	*	*	*	*	*	*	*	836
12 PM	778	825	855	835	*	*	*	*	*	*	*	*	*	*	817
1	824	831	899	855	*	*	*	*	*	*	*	*	*	*	862
2	1012	899	1042	872	*	*	*	*	*	*	*	*	*	*	1027
3	1191	757	1226	733	*	*	*	*	*	*	*	*	*	*	1209
4	1012	813	1129	745	*	*	*	*	*	*	*	*	*	*	1070
5	938	749	874	771	*	*	*	*	*	*	*	*	*	*	902
6	781	623	706	639	*	*	*	*	*	*	*	*	*	*	734
7	713	591	692	546	*	*	*	*	*	*	*	*	*	*	703
8	642	530	690	520	*	*	*	*	*	*	*	*	*	*	666
9	577	472	511	512	*	*	*	*	*	*	*	*	*	*	544
10	479	434	470	424	*	*	*	*	*	*	*	*	*	*	475
11	432	196	417	312	*	*	*	*	*	*	*	*	*	*	425
TOTALS	10203	8553	15405	13456	2337	2840	*	*	*	*	*	*	*	*	14805

COMBINED TOTALS

12	*	227	482	*	*	*	*	355
1	*	133	302	*	*	*	*	219
2	*	98	171	*	*	*	*	135
3	*	90	154	*	*	*	*	123
4	*	108	215	*	*	*	*	162
5	*	449	649	*	*	*	*	550
6	*	1708	1670	*	*	*	*	1690
7	*	1933	1497	*	*	*	*	1715
8	*	1870	37	*	*	*	*	954
9	*	1739	*	*	*	*	*	1739
10	*	1608	*	*	*	*	*	1608
11	1674	1620	*	*	*	*	*	1648
12	1803	1691	*	*	*	*	*	1648
1	1675	1754	*	*	*	*	*	1715
2	1911	1914	*	*	*	*	*	1913
3	1948	1959	*	*	*	*	*	1954
4	1825	1873	*	*	*	*	*	1849
5	1670	1645	*	*	*	*	*	1658
6	1384	1345	*	*	*	*	*	1365
7	1304	1238	*	*	*	*	*	1272
8	1172	1213	*	*	*	*	*	1190
9	1049	1020	*	*	*	*	*	1035
10	913	894	*	*	*	*	*	904
11	828	729	*	*	*	*	*	677
TOTALS	18758	28861	5177	*	*	*	*	23082

SITE CODE : 00020212 WANABEE, WANSEN, BRISTOL

Location : MELNEA CASS BLVD.S.OF MASS.AVE

City,State: BOSTON,MA.

Operator : CP/BL

PAGE: 1

FILE: BOSTON

DATE: 12/03/88

TIME BEGIN	MONDAY 3 Ch 1	MONDAY 3 Ch 2	TUESDAY 4 Ch 1	TUESDAY 4 Ch 2	WEDNESDAY 5 Ch 1	WEDNESDAY 5 Ch 2	THURSDAY 6 Ch 1	THURSDAY 6 Ch 2	FRIDAY 7 Ch 1	FRIDAY 7 Ch 2	SATURDAY 8 Ch 1	SATURDAY 8 Ch 2	SUNDAY 9 Ch 1	SUNDAY 9 Ch 2	WEEK AVERAGE Ch 1	WEEK AVERAGE Ch 2
12:00 AM	*	*	*	*	*	*	236	200	259	203	374	326	364	353	308	279
1:00	*	*	*	*	*	*	174	166	135	137	244	240	246	265	200	202
2:00	*	*	*	*	*	*	99	77	174	98	206	174	257	250	184	149
3:00	*	*	*	*	*	*	75	55	102	79	127	113	147	97	113	86
4:00	*	*	*	*	*	*	134	122	104	114	112	113	98	71	112	109
5:00	*	*	*	*	*	*	339	395	313	390	190	165	89	65	226	253
6:00	*	*	*	*	*	*	685	942	599	1108	300	376	194	220	440	661
7:00	*	*	*	*	*	*	902	1307	948	1207	461	576	313	259	656	837
8:00	*	*	*	*	*	*	1007	1175	1003	1242	541	638	325	279	719	822
9:00	*	*	*	*	*	*	815	1113	859	1065	651	673	374	334	877	795
10:00	*	*	*	*	928	928	857	1036	987	923	769	725	468	559	781	808
11:00	*	*	*	*	925	878	933	917	977	944	845	738	577	556	851	805
12:00 PM	*	*	*	*	966	948	977	971	1073	1009	933	850	661	623	922	850
1:00	*	*	*	*	1002	932	1088	1022	1097	991	907	751	722	678	963	874
2:00	*	*	*	*	771	936	1220	1021	1252	1033	859	791	799	671	930	890
3:00	*	*	*	*	1259	999	1293	975	1200	997	961	753	699	667	1082	878
4:00	*	*	*	*	1229	950	1229	902	1229	872	872	809	637	653	1043	843
5:00	*	*	*	*	1070	954	1038	952	1007	838	732	727	578	613	889	816
6:00	*	*	*	*	862	758	890	774	891	779	695	640	565	695	780	729
7:00	*	*	*	*	778	547	845	584	765	600	624	581	583	559	720	574
8:00	*	*	*	*	687	476	714	527	611	538	490	495	507	407	601	488
9:00	*	*	*	*	651	432	660	513	603	531	497	431	441	393	576	463
10:00	*	*	*	*	571	443	557	539	562	569	435	310	423	349	510	442
11:00	*	*	*	*	436	344	464	424	546	490	445	472	354	301	449	408
TOTALS	*	*	*	*	12066	10527	17194	16710	17345	16790	13250	12477	10450	9946	14781	14123

COMBINED TOTALS

12:00 AM	*	*	*	436	497	700	717	587
1:00	*	*	*	340	275	484	511	402
2:00	*	*	*	176	272	380	507	333
3:00	*	*	*	130	192	240	244	199
4:00	*	*	*	256	218	225	169	217
5:00	*	*	*	704	708	355	153	479
6:00	*	*	*	1611	1707	676	414	1101
7:00	*	*	*	2209	2135	1037	571	1493
8:00	*	*	*	2182	2245	1179	604	1552
9:00	*	*	*	1928	1952	1304	708	1472
10:00	*	*	1766	1893	1910	1504	1027	1619
11:00	*	*	1796	1850	1921	1583	1133	1656
12:00 PM	*	*	1914	1948	2082	1783	1284	1502
1:00	*	*	1934	2110	2088	1658	1400	1837
2:00	*	*	1707	2241	2285	1650	1470	1870
3:00	*	*	2258	2268	2197	1714	1366	1920
4:00	*	*	2179	2141	2111	1681	1320	1886
5:00	*	*	2024	1990	1845	1459	1211	1705
6:00	*	*	1620	1664	1670	1335	1260	1509
7:00	*	*	1325	1429	1365	1205	1147	1294
8:00	*	*	1163	1241	1149	985	914	1059
9:00	*	*	1113	1173	1134	928	804	1036
10:00	*	*	1014	1096	1131	745	777	952
11:00	*	*	760	888	1036	917	825	855
TOTALS	*	*	22593	33904	34135	28727	2 381	28905

[illegible]-CHANGE STATION
VOLUME - 2 DIRECTIONAL - VEHICLE COUNT
CORRECTION FACTOR: 1.00

REPORT ON [illegible] DATE
LOCATION: [illegible] ST & [illegible] ST [illegible]
WEATHER:
[illegible]

FILE NAME: [illegible]
NOT IF MODIFIED: [illegible]

HOUR BEGINS	MONDAY 01 W	MONDAY 01 E	TUESDAY 02 W	TUESDAY 02 E	WEDNESDAY 03 W	WEDNESDAY 03 E	THURSDAY 04 W	THURSDAY 04 E	FRIDAY 05 W	FRIDAY 05 E	SATURDAY 06 W	SATURDAY 06 E	SUNDAY 07 W	SUNDAY 07 E	WEEKDAY AVERAGE W
12 AM	*	*	*	*	*	*	*	*	86	286	*	*	*	*	86
1	*	*	*	*	*	*	*	*	38	71	*	*	*	*	38
2	*	*	*	*	*	*	*	*	37	37	*	*	*	*	37
3	*	*	*	*	*	*	*	*	22	22	*	*	*	*	22
4	*	*	*	*	*	*	*	*	39	21	*	*	*	*	39
5	*	*	*	*	*	*	*	*	105	56	*	*	*	*	105
6	*	*	*	*	*	*	*	*	242	210	*	*	*	*	242
7	*	*	*	*	*	*	*	*	387	489	*	*	*	*	387
8	*	*	*	*	*	*	*	*	412	494	*	*	*	*	412
9	*	*	*	*	*	*	*	*	342	417	*	*	*	*	342
10	*	*	*	*	*	*	*	*	333	363	*	*	*	*	333
11	*	*	*	*	*	*	*	*	415	378	*	*	*	*	415
12 PM	*	*	*	*	*	*	*	*	454	471	*	*	*	*	454
1	*	*	*	*	*	*	736	707	*	*	*	*	*	*	736
2	*	*	*	*	*	*	456	555	*	*	*	*	*	*	456
3	*	*	*	*	*	*	594	477	*	*	*	*	*	*	594
4	*	*	*	*	*	*	570	539	*	*	*	*	*	*	570
5	*	*	*	*	*	*	538	416	*	*	*	*	*	*	538
6	*	*	*	*	*	*	382	347	*	*	*	*	*	*	382
7	*	*	*	*	*	*	241	219	*	*	*	*	*	*	241
8	*	*	*	*	*	*	191	170	*	*	*	*	*	*	191
9	*	*	*	*	*	*	124	186	*	*	*	*	*	*	124
10	*	*	*	*	*	*	122	333	*	*	*	*	*	*	122
11	*	*	*	*	*	*	133	281	*	*	*	*	*	*	133
TOTALS	*	*	*	*	*	*	3895	3760	2920	3401	*	*	*	*	6815

COMBINED TOTALS

12	*	*	*	*	332	*	*	332
1	*	*	*	*	109	*	*	109
2	*	*	*	*	74	*	*	74
3	*	*	*	*	63	*	*	63
4	*	*	*	*	60	*	*	60
5	*	*	*	*	161	*	*	161
6	*	*	*	*	552	*	*	552
7	*	*	*	*	876	*	*	876
8	*	*	*	*	906	*	*	906
9	*	*	*	*	759	*	*	759
10	*	*	*	*	693	*	*	693
11	*	*	*	*	791	*	*	791
12	*	*	*	*	925	*	*	925
1	*	*	*	693	*	*	*	693
2	*	*	*	811	*	*	*	811
3	*	*	*	1017	*	*	*	1017
4	*	*	*	1109	*	*	*	1109
5	*	*	*	942	*	*	*	942
6	*	*	*	729	*	*	*	729
7	*	*	*	450	*	*	*	450
8	*	*	*	381	*	*	*	381
9	*	*	*	210	*	*	*	210
10	*	*	*	457	*	*	*	457
11	*	*	*	519	*	*	*	519
TOTALS	*	*	*	7355	6221	*	*	13575

TENNESSEE HAYDEN OF 1971
FOUR-WAY 2 CHANNEL VEHICLE COUNT

REPORT ID: 2127 CORRECTION FACTOR: 1.00

LOCATION : ALBANY N OF UNION PARK EASTBOUND

FILENAME: ALBANY

WEATHER :

WEEK OF MONDAY 8/ 2/ 88

OPERATOR : JO THE MAN

HOUR BEGINS	MONDAY 20 N	MONDAY 20 S	TUESDAY 21 N	TUESDAY 21 S	WEDNESDAY 22 N	WEDNESDAY 22 S	THURSDAY 23 N	THURSDAY 23 S	FRIDAY 24 N	FRIDAY 24 S	SATURDAY 25 N	SATURDAY 25 S	SUNDAY 26 N	SUNDAY 26 S	WEEKDAY AVE N
12 AM	:	:	92	102	95	173	:	:	:	:	:	:	:	:	94
1	:	:	61	38	58	67	:	:	:	:	:	:	:	:	60
2	:	:	43	33	29	48	:	:	:	:	:	:	:	:	36
3	:	:	29	31	34	27	:	:	:	:	:	:	:	:	32
4	:	:	41	65	43	107	:	:	:	:	:	:	:	:	42
5	:	:	136	171	148	179	:	:	:	:	:	:	:	:	142
6	:	:	307	333	283	339	:	:	:	:	:	:	:	:	295
7	:	:	409	749	430	794	:	:	:	:	:	:	:	:	419
8	:	:	427	709	476	720	:	:	:	:	:	:	:	:	451
9	:	:	469	608	416	645	:	:	:	:	:	:	:	:	443
10	:	:	423	527	:	:	:	:	:	:	:	:	:	:	423
11	:	:	525	467	:	:	:	:	:	:	:	:	:	:	525
12 PM	459	423	552	455	:	:	:	:	:	:	:	:	:	:	506
1	486	412	491	464	:	:	:	:	:	:	:	:	:	:	487
2	530	482	562	439	:	:	:	:	:	:	:	:	:	:	546
3	823	493	636	802	:	:	:	:	:	:	:	:	:	:	730
4	830	569	694	554	:	:	:	:	:	:	:	:	:	:	862
5	737	590	708	446	:	:	:	:	:	:	:	:	:	:	722
6	454	298	451	312	:	:	:	:	:	:	:	:	:	:	453
7	316	222	315	219	:	:	:	:	:	:	:	:	:	:	316
8	237	176	249	175	:	:	:	:	:	:	:	:	:	:	244
9	181	174	213	173	:	:	:	:	:	:	:	:	:	:	187
10	157	273	158	252	:	:	:	:	:	:	:	:	:	:	158
11	175	355	132	306	:	:	:	:	:	:	:	:	:	:	154
TOTALS	5387	4489	8352	8667	2013	3325	:	:	:	:	:	:	:	:	8346

COMBINED TOTALS

12	:	224	268	:	:	:	:	247
1	:	97	125	:	:	:	:	112
2	:	81	77	:	:	:	:	79
3	:	60	61	:	:	:	:	61
4	:	110	150	:	:	:	:	130
5	:	307	327	:	:	:	:	317
6	:	840	838	:	:	:	:	839
7	:	1157	1224	:	:	:	:	1191
8	:	1136	1206	:	:	:	:	1172
9	:	1077	1061	:	:	:	:	1070
10	:	950	:	:	:	:	:	950
11	:	992	:	:	:	:	:	992
12	902	1037	:	:	:	:	:	955
1	878	955	:	:	:	:	:	927
2	1012	1001	:	:	:	:	:	1007
3	1316	1438	:	:	:	:	:	1378
4	1399	1448	:	:	:	:	:	1424
5	1327	1154	:	:	:	:	:	1241
6	752	794	:	:	:	:	:	774
7	538	533	:	:	:	:	:	536
8	415	424	:	:	:	:	:	420
9	335	356	:	:	:	:	:	351
10	422	410	:	:	:	:	:	422
11	550	428	:	:	:	:	:	485
TOTALS	9856	17019	5337	:	:	:	:	17348

TENNESSEE TRANSPORTATION
HOURLY 2 CHANNEL VEHICLE COUNT
DIRECTION FACTOR 1.00

REFERENCE: 2107
LOCATION : MASS AVE IN PARK TO 1ST BOSTON, MA.
WEATHER :
OPERATOR : SEM/CB/MA

FILENAME: 2107A07
DATE OF COUNT 8 / 21 88

HOUR BEGINS	MONDAY 20 S	MONDAY 20 N	TUESDAY 21 S	TUESDAY 21 N	WEDNESDAY 22 S	WEDNESDAY 22 N	THURSDAY 23 S	THURSDAY 23 N	FRIDAY 24 S	FRIDAY 24 N	SATURDAY 25 S	SATURDAY 25 N	SUNDAY 26 S	SUNDAY 26 N	WEEKDAY AVERA S
12 AM	:	:	240	135	268	0	:	:	:	:	:	:	:	:	254
1	:	:	111	79	125	0	:	:	:	:	:	:	:	:	118
2	:	:	74	75	106	0	:	:	:	:	:	:	:	:	90
3	:	:	40	60	41	0	:	:	:	:	:	:	:	:	41
4	:	:	36	71	43	0	:	:	:	:	:	:	:	:	40
5	:	:	85	250	81	0	:	:	:	:	:	:	:	:	73
6	:	:	257	577	260	0	:	:	:	:	:	:	:	:	259
7	:	:	603	599	616	0	:	:	:	:	:	:	:	:	610
8	:	:	715	555	707	0	:	:	:	:	:	:	:	:	712
9	:	:	576	521	:	:	:	:	:	:	:	:	:	:	576
10	:	:	555	563	:	:	:	:	:	:	:	:	:	:	555
11	:	:	685	515	:	:	:	:	:	:	:	:	:	:	635
12 PM	:	:	711	227	:	:	:	:	:	:	:	:	:	:	711
1	579	502	762	0	:	:	:	:	:	:	:	:	:	:	721
2	917	581	955	0	:	:	:	:	:	:	:	:	:	:	922
3	1202	415	1290	0	:	:	:	:	:	:	:	:	:	:	1258
4	1200	308	1220	0	:	:	:	:	:	:	:	:	:	:	1212
5	1070	291	1078	0	:	:	:	:	:	:	:	:	:	:	1054
6	775	257	806	0	:	:	:	:	:	:	:	:	:	:	791
7	651	395	670	0	:	:	:	:	:	:	:	:	:	:	661
8	556	362	566	0	:	:	:	:	:	:	:	:	:	:	626
9	522	372	484	0	:	:	:	:	:	:	:	:	:	:	590
10	401	344	400	0	:	:	:	:	:	:	:	:	:	:	401
11	386	240	402	0	:	:	:	:	:	:	:	:	:	:	469
TOTALS	8428	4090	13466	4270	2247	0	:	:	:	:	:	:	:	:	13358

COMBINED TOTALS

12	:	375	268	:	:	:	:	322
1	:	190	125	:	:	:	:	158
2	:	149	106	:	:	:	:	128
3	:	100	41	:	:	:	:	71
4	:	127	43	:	:	:	:	85
5	:	315	81	:	:	:	:	198
6	:	854	260	:	:	:	:	558
7	:	1201	616	:	:	:	:	909
8	:	1271	707	:	:	:	:	990
9	:	1097	:	:	:	:	:	1097
10	:	1151	:	:	:	:	:	1151
11	:	1204	:	:	:	:	:	1204
12	:	933	:	:	:	:	:	933
1	1181	762	:	:	:	:	:	972
2	1414	953	:	:	:	:	:	1184
3	1637	1290	:	:	:	:	:	1466
4	1511	1220	:	:	:	:	:	1366
5	1381	1078	:	:	:	:	:	1230
6	1132	806	:	:	:	:	:	970
7	1046	670	:	:	:	:	:	858
8	948	566	:	:	:	:	:	807
9	894	484	:	:	:	:	:	689
10	745	400	:	:	:	:	:	573
11	627	402	:	:	:	:	:	571
TOTALS	12698	17736	2247	:	:	:	:	13457

7

[illegible]

REFERENCE: [illegible]
LOCATION : MASS AVE OFF RAMPS FROM IPC W/B BOSTON, MA
WEATHER :
OPERATOR : BGH/BB/MA

CORRECTION FACTOR: 1.00

FILENAME: [illegible]
WEEK OF MONDA[illegible]

HOUR BEGINS	MONDAY 20 F	MONDAY 20 F	TUESDAY 21 F	TUESDAY 21 F	WEDNESDAY 22 F	WEDNESDAY 22 F	THURSDAY 23 F	THURSDAY 23 F	FRIDAY 24 F	FRIDAY 24 F	SATURDAY 25 F	SATURDAY 25 F	SUNDAY 26 F	SUNDAY 26 F	WEEKDAY AVE F
12 AM	:	:	171	0	191	137	:	:	:	:	:	:	:	:	181
1	:	:	113	0	124	69	:	:	:	:	:	:	:	:	119
2	:	:	83	1	82	40	:	:	:	:	:	:	:	:	83
3	:	:	74	0	92	45	:	:	:	:	:	:	:	:	83
4	:	:	109	0	116	77	:	:	:	:	:	:	:	:	112
5	:	:	315	0	318	415	:	:	:	:	:	:	:	:	317
6	:	:	746	850	702	1196	:	:	:	:	:	:	:	:	724
7	:	:	857	1146	784	1200	:	:	:	:	:	:	:	:	821
8	:	:	738	1225	795	1180	:	:	:	:	:	:	:	:	767
9	:	:	777	1073	:	:	:	:	:	:	:	:	:	:	777
10	:	:	792	898	:	:	:	:	:	:	:	:	:	:	792
11	:	:	791	955	:	:	:	:	:	:	:	:	:	:	791
12 PM	:	:	763	924	:	:	:	:	:	:	:	:	:	:	763
1	733	767	804	762	:	:	:	:	:	:	:	:	:	:	769
2	833	536	807	760	:	:	:	:	:	:	:	:	:	:	820
3	696	0	562	719	:	:	:	:	:	:	:	:	:	:	629
4	574	0	538	736	:	:	:	:	:	:	:	:	:	:	556
5	432	0	545	784	:	:	:	:	:	:	:	:	:	:	489
6	492	0	500	622	:	:	:	:	:	:	:	:	:	:	496
7	471	0	448	501	:	:	:	:	:	:	:	:	:	:	460
8	451	0	430	411	:	:	:	:	:	:	:	:	:	:	441
9	429	0	435	400	:	:	:	:	:	:	:	:	:	:	432
10	329	0	340	363	:	:	:	:	:	:	:	:	:	:	335
11	236	0	230	232	:	:	:	:	:	:	:	:	:	:	233
TOTALS	5676	1303	11968	13362	3204	4359	:	:	:	:	:	:	:	:	11991

COMBINED TOTALS

12	:	171	328	:	:	:	:	250
1	:	113	193	:	:	:	:	154
2	:	84	122	:	:	:	:	104
3	:	74	137	:	:	:	:	106
4	:	109	193	:	:	:	:	152
5	:	315	733	:	:	:	:	525
6	:	1596	1898	:	:	:	:	1747
7	:	2003	1984	:	:	:	:	1994
8	:	1963	1975	:	:	:	:	1970
9	:	1850	:	:	:	:	:	1850
10	:	1690	:	:	:	:	:	1690
11	:	1746	:	:	:	:	:	1746
12	:	1687	:	:	:	:	:	1687
1	1500	1566	:	:	:	:	:	1534
2	1369	1567	:	:	:	:	:	1468
3	696	1281	:	:	:	:	:	989
4	574	1274	:	:	:	:	:	924
5	432	1329	:	:	:	:	:	881
6	492	1122	:	:	:	:	:	807
7	471	949	:	:	:	:	:	711
8	451	841	:	:	:	:	:	647
9	429	835	:	:	:	:	:	632
10	329	703	:	:	:	:	:	517
11	236	462	:	:	:	:	:	349
TOTALS	6979	25320	7563	:	:	:	:	22434

Intersection Turning Movement Counts:

Location Number	Description
1	Massachusetts Avenue and Albany Street (1990)
2	Albany Street and East Berkeley Street (1990)
3	Albany Street and Malden Street (1990)
4	Southampton Street and I-93 Southbound Ramps (1988)
5	Southampton Street and I-93 Northbound Ramps (1988)

Vanasse Hangen Brustlin, Inc.

Site Code : 00282512
N-S Street: ALBANY STREET
E-W Street: MASS AVE.
CITY.STATE: BOSTON.MA.

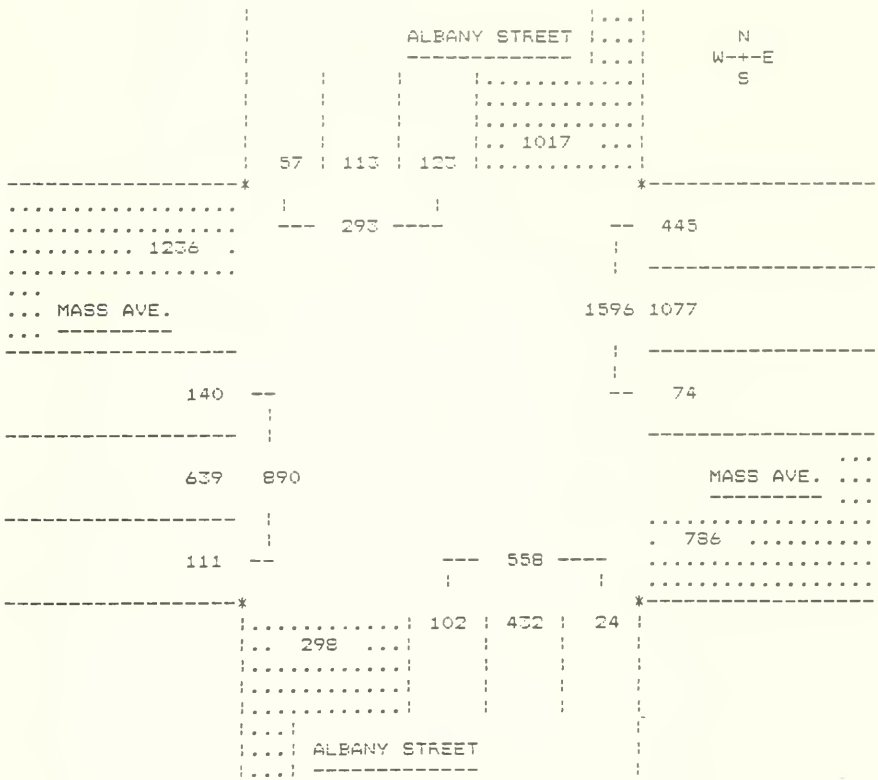
Bus of the CARS and TRUCKS

PAGE: 1
FILE: ALB1308

DATE: 12/05/90

PEAK PERIOD ANALYSIS FOR THE PERIOD: 7:30 AM - 9:00 AM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	7:45 AM	0.86	57	113	123	293	19	39	42
East	7:45 AM	0.87	445	1077	74	1596	28	67	5
South	7:45 AM	0.88	24	432	102	558	4	77	18
West	7:45 AM	0.94	111	639	140	890	12	72	16
Entire Intersection									
North	7:45 AM	0.86	57	113	123	293	19	39	42
East		0.87	445	1077	74	1596	28	67	5
South		0.88	24	432	102	558	4	77	18
West		0.94	111	639	140	890	12	72	16



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                    :                                  :...:
                    :                ALBANY STREET     :...:        N
                    :                -------------     :...:      W-+-E
                    :      :      :      :............:        S
                    :      :      :      :............:
                    :      :      :      :............:
                    :      :      :      :.. 1017   ...:
                    :  57  : 113  : 123  :............:
-------------------*                                   *-------------------
...................   :            :
...................   ---  293  ----                 --  445
.......... 1236  .                                   :
...................                                  :  -------------------
...
... MASS AVE.                                     1596 1077
... ---------
-------------------                                  :  -------------------
                                                     :
             140  --                                 --   74
                   :
-------------------  :                                  -------------------
                                                                        ...
             639   890                                     MASS AVE. ...
                                                           --------- ...
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                     :                                  .  786  ..........
             111  --                 ---  558 ----      ...................
                                     :            :     ...................
-------------------*                                   *-------------------
                   :............: 102 : 432 :  24 :
                   :..  298  ...:     :     :     :
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                   :............:     :     :     :
                   :...:                           :
                   :...: ALBANY STREET             :
                   :...: -------------             :
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Vanasse Hangen Brustlin, Inc.

Site Code : 00220010
N-S Street: ALBANY STREET
E-W Street: MASS AVE.
CITY,STATE: BOSTON,MA.

Sum of the CARS and TRUCKS

DATE: 12/04/90

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:30 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	VOLUMES Thru	VOLUMES Left	VOLUMES Total	PERCENTS Right	PERCENTS Thru	PERCENTS Left
South	4:30 PM	0.93	66	221	80	367	15	60	22
West	4:30 PM	0.94	102	978	35	1115	9	88	3
North	4:45 PM	0.91	99	363	344	806	12	45	43
East	4:45 PM	0.93	158	852	50	1060	15	80	5
Entire Intersection									
South	4:45 PM	0.92	56	222	85	363	15	61	23
West		0.93	99	962	37	1098	9	88	3
North		0.91	99	363	344	806	12	45	43
East		0.93	158	852	50	1060	15	80	5

Site Code : 00002512
N-S Street: ALBANY STREET
E-W Street: E.BERKLEY STREET
CITY,STATE: BOSTON,MA.

Sum of the CARS and TRUCKS

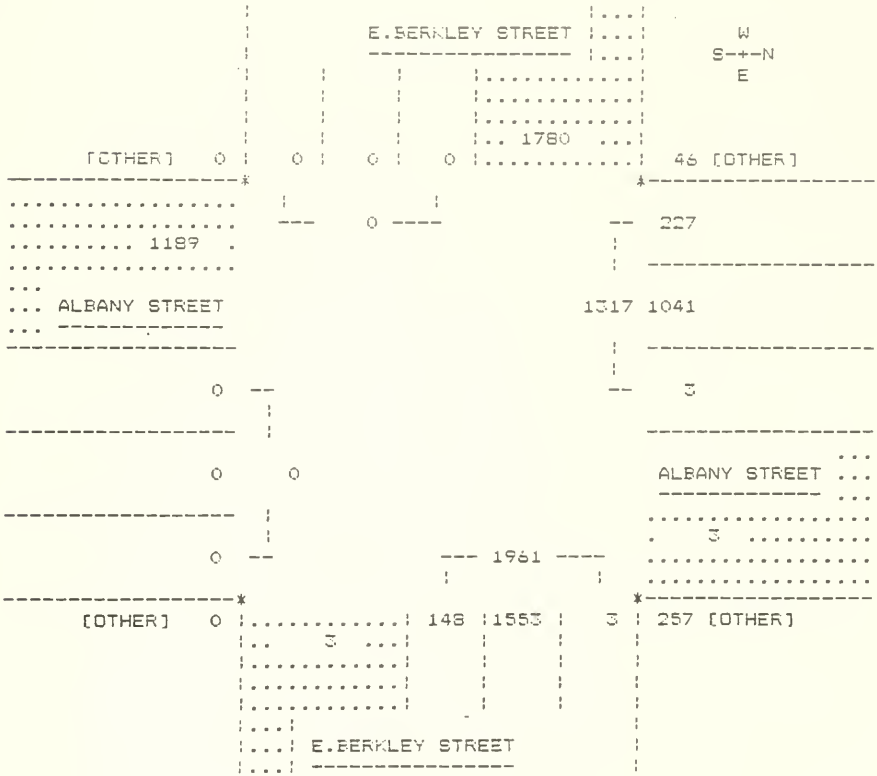
DATE: 12/05/90

PEAK PERIOD ANALYSIS FOR THE PERIOD: 7:30 AM - 9:00 AM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES OTHER	Right	Thru	Left	Total	PERCENTS OTHER	Right	Thru	Left
West	7:45 AM	0.00	0	0	0	0	0	0	0	0	0
North	8:00 AM	0.93	46	239	1036	3	1324	3	18	78	0
East	7:45 AM	0.92	257	3	1553	148	1961	13	0	79	8
South	7:45 AM	0.00	0	0	0	0	0	0	0	0	0

Entire Intersection

West	7:45 AM	0.00	0	0	0	0	0	0	0	0	0
North		0.93	46	227	1041	3	1317	3	17	79	0
East		0.92	257	3	1553	148	1961	13	0	79	8
South		0.00	0	0	0	0	0	0	0	0	0



Vanasse Hangen Brustlin, Inc.

Site Code : [illegible]
N-S Street: ALBANY STREET
E-W Street: E.BERKLEY STREET
CITY,STATE: BOSTON,MA.

Bus of the CARS and TRUCKS

PAGE: 1
FILE: BERKCBCB

DATE: 12/04/90

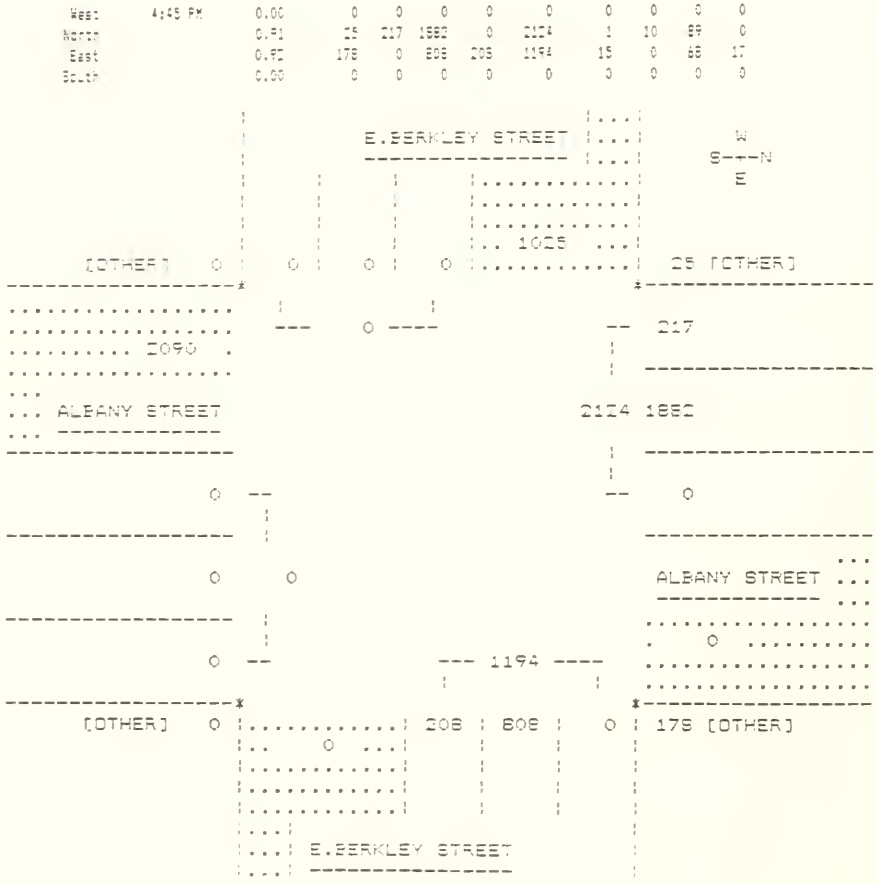
(2)

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:30 PM - 6:00 PM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES OTHER	Right	Thru	Left	Total	PERCENTS OTHER	Right	Thru	Left
West	4:45 PM	0.00	0	0	0	0	0	0	0	0	0
North	4:45 PM	0.91	25	217	1882	0	2124	1	10	89	0
East	4:30 PM	0.95	194	0	803	240	1237	16	0	65	19
South	4:30 PM	0.00	0	0	0	0	0	0	0	0	0

Entire Intersection

West	4:45 PM	0.00	0	0	0	0	0	0	0	0	0
North		0.91	25	217	1882	0	2124	1	10	89	0
East		0.92	178	0	808	208	1194	15	0	68	17
South		0.00	0	0	0	0	0	0	0	0	0



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                    |                                  |...|
                    |          E.BERKLEY STREET        |...|        W
                    |          ----------------        |...|      S---N
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                   |..    0  ...|     |     |      |
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                   |.............|     |     |      |
                   |.............|     |     |      |
                   |...|                            |
                   |...| E.BERKLEY STREET           |
                   |...| ----------------           |
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Vanasse Hangen Brustlin, Inc.

Site Code : 2825.12
W-S Street: ALBANY STREET
E-W Street: MALDEN STREET
CITY,STATE: BOSTON,MA.

Sum of the CARS and TRUCKS

PAGE: 1
FILE: ALBIMAL

DATE: 12/05/90

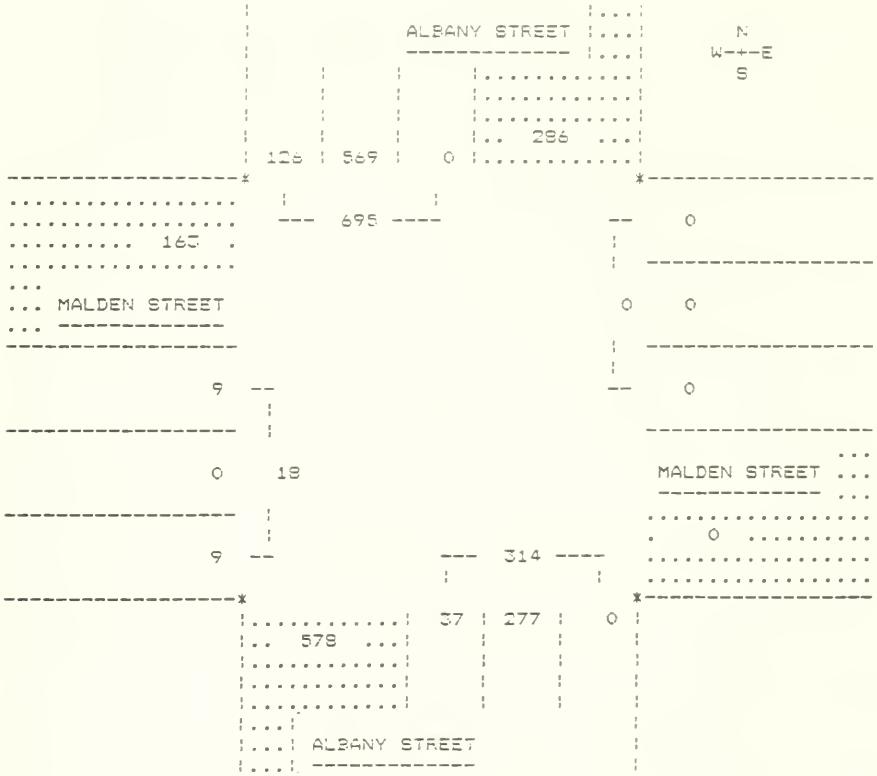
(3)

PEAK PERIOD ANALYSIS FOR THE PERIOD: 7:30 AM - 9:00 AM

DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	8:00 AM	0.91	126	569	0	695	18	82	0
East	8:00 AM	0.00	0	0	0	0	0	0	0
South	7:30 AM	0.96	0	296	33	329	0	90	10
West	8:00 AM	0.64	9	0	9	18	50	0	50

Entire Intersection

North	8:00 AM	0.91	126	569	0	695	18	82	0
East		0.00	0	0	0	0	0	0	0
South		0.91	0	277	37	314	0	88	12
West		0.64	9	0	9	18	50	0	50



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                    |                          |...|
                    |          ALBANY STREET   |...|        N
                    |          -------------   |...|      W-+-E
                    |      |      |      |...........|        S
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                    |      |      |      |..  286  ...|
                    | 126  | 569  |   0  |...........|
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                    |............|  37 | 277 |   0 |
                    |..  578  ...|     |     |     |
                    |............|     |     |     |
                    |............|     |     |     |
                    |............|     |     |     |
                    |...|                          |
                    |...| ALBANY STREET            |
                    |...| -------------            |
```

Vanasse Hangen Brustlin, Inc.

Site Code : 2925.12
N-S Street: ALBANY STREET
E-W Street: MALDEN STREET
CITY,STATE: BOSTON,MA.

Sum of the CARS and TRUCKS

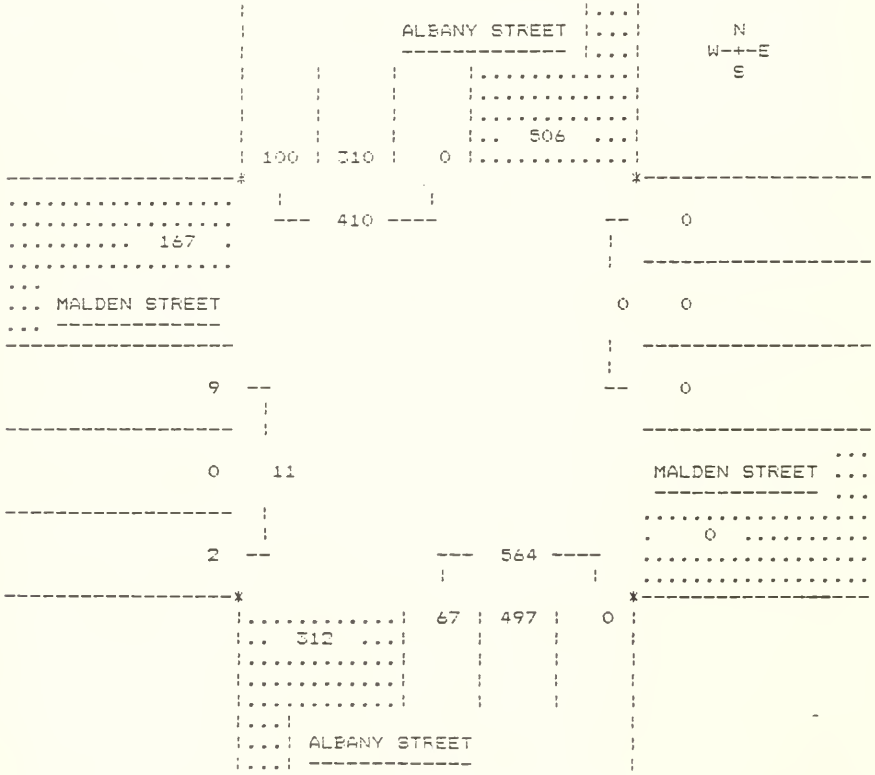
PAGE: 1
FILE: ALSCHAL

DATE: 12/04/90

(3)

PEAK PERIOD ANALYSIS FOR THE PERIOD: 4:30 PM - 6:30 PM

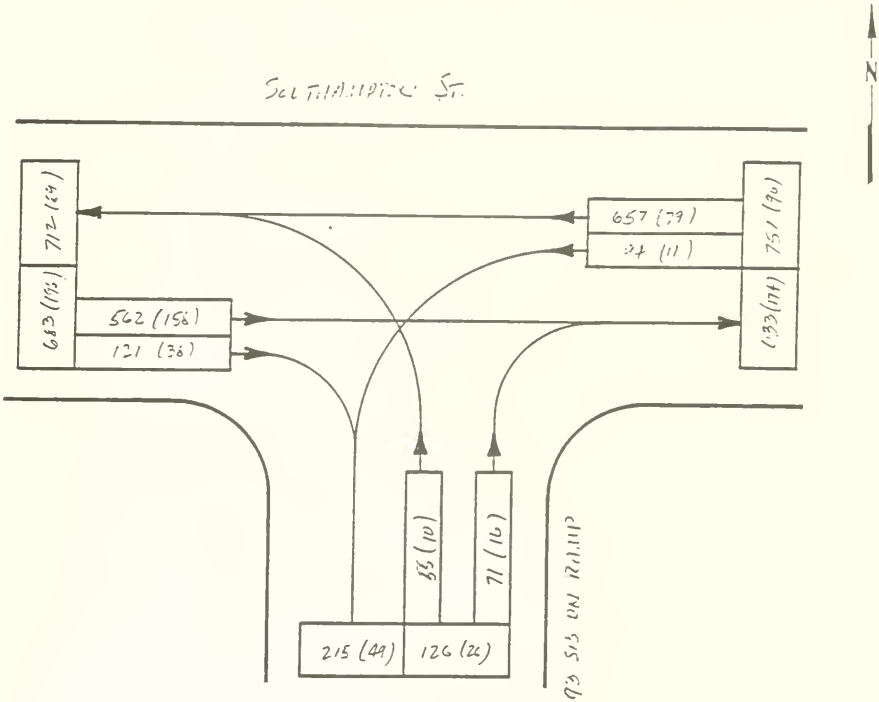
DIRECTION FROM	START PEAK HOUR	PEAK HR FACTOR	VOLUMES Right	Thru	Left	Total	PERCENTS Right	Thru	Left
North	5:00 PM	0.79	84	358	0	442	19	81	0
East	5:00 PM	0.00	0	0	0	0	0	0	0
South	4:30 PM	0.80	0	497	67	564	0	88	12
West	4:30 PM	0.55	2	0	9	11	18	0	82
Entire Intersection									
North	4:30 PM	0.74	100	310	0	410	24	76	0
East	TOTAL	0.00	0	0	0	0	0	0	0
South	P.H.F	0.80	0	497	67	564	0	88	12
West	.78	0.55	2	0	9	11	18	0	82



Vanasse/Hangen
Consulting Engineers & Planners
60 Birmingham Parkway, Boston, MA 02135
617/783-7000

INTERSECTION TURNING MOVEMENT COUNT

CITY Boston Mass DATE 6/21/88 DAY of WEEK Tue.
INTERSECTION Southampton / I-93 SB on Ramp JOB No. 2177

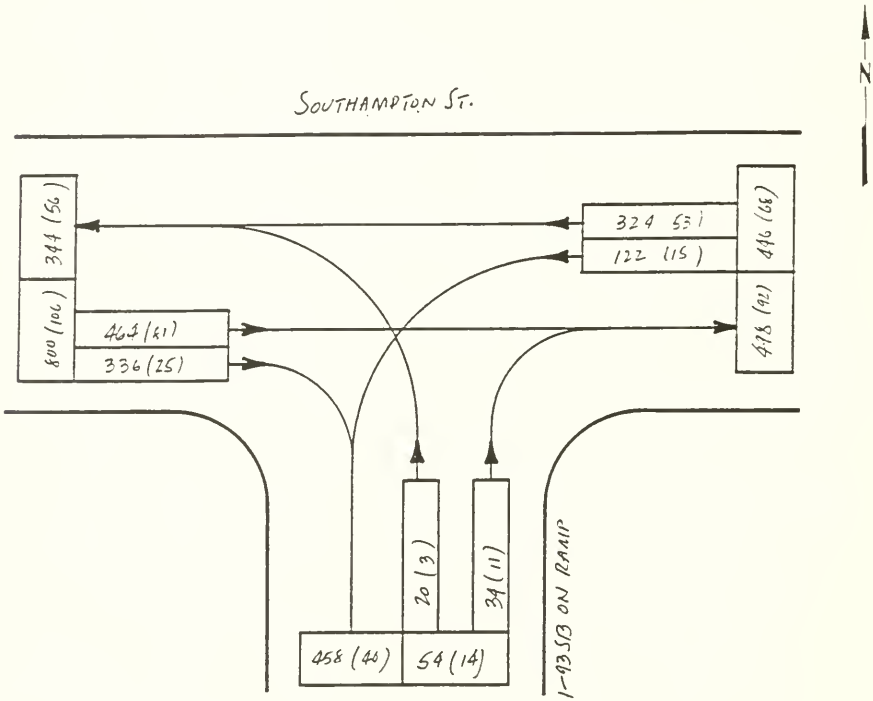


STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT 0700-0900
Southampton St. EB	683 (196)	44	0700 – 0800 PEAK HOUR
Southampton St WB	751 (90)	48	
I-93 SB on Ramp	126 (26)	8	PHF = 0.92
			VEHICLES COUNTED
			ALL VEHICLES XXX 1560
			TRUCKS (XX) 312
TOTAL	1560/312	100	PERCENT TRUCKS ≈ 20 %

Vanasse/Hangen
Consulting Engineers & Planners
60 Birmingham Parkway, Boston, MA 02135
617/783-7000

INTERSECTION TURNING MOVEMENT COUNT

CITY BOSTON, MASS DATE 6/20/88 DAY of WEEK MON
INTERSECTION SOUTHAMPTON/I-93 SB ON RAMP JOB No. 2177

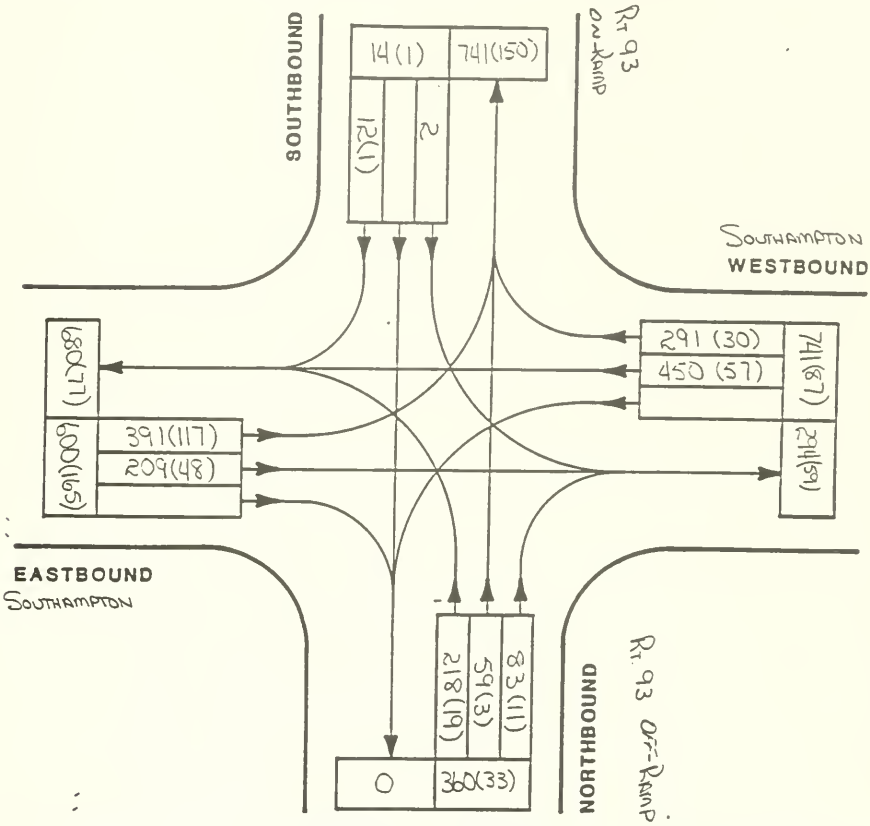


STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT 1600-1800
SOUTHAMPTON EB	800 (106)	62	1600-1700 PEAK HOUR
SOUTHAMPTON WB	446 (165)	34	
I-93 SB ON RAMP	54 (14)	4	PHF = 0.83
			VEHICLES COUNTED
			ALL VEHICLES XXX 1300
			TRUCKS (XX) 188
TOTAL	1300 (188)	100	PERCENT TRUCKS 14 %

Vanasse Hangen Brustlin, Inc.
60 Birmingham Parkway
Boston, Massachusetts 02135
617/783-7000

INTERSECTION TURNING MOVEMENT COUNT

CITY Boston DATE 6-21-88 DAY of WEEK Tuesday
INTERSECTION Southampton / I-93 N.B. On/Off Ramp JOB No. 2177

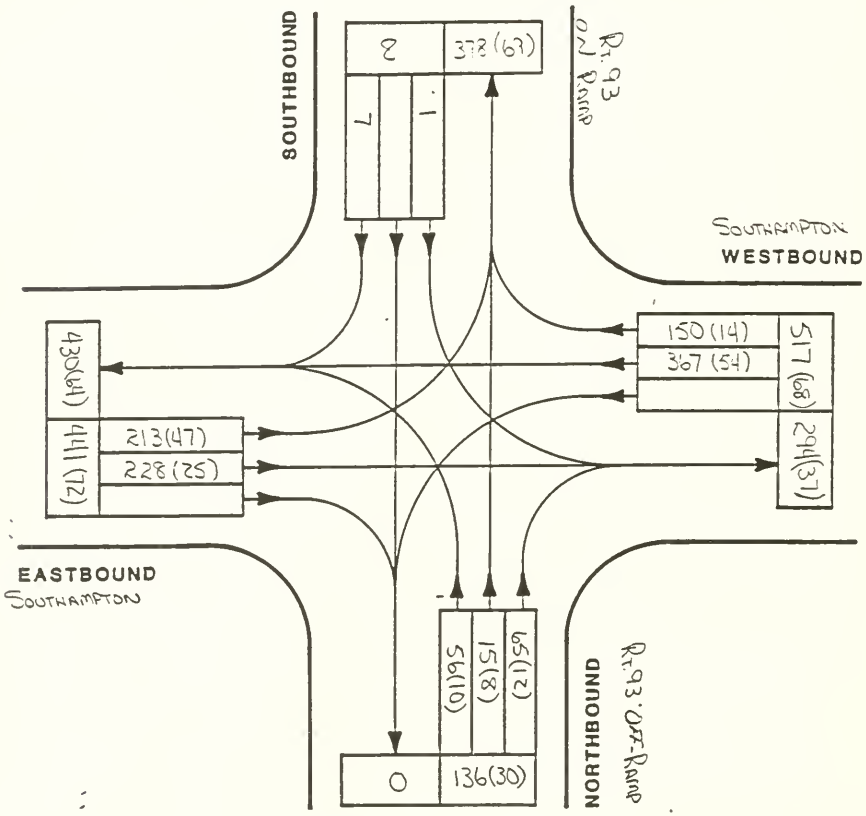


STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT
Exit Ramp, Rt. 93 SB	741(150)	43%	A.M. Peak Hour 7:00 - 8:00 A.M.
Southampton WB	291(59)	17%	
Exit Ramp R-93 NB	0	0%	Peak Hour Factor .98
Southampton EB	680 (77)	40%	
			VEHICLES COUNTED
			ALL VEHICLES XXX 1715
			TRUCKS (XX) 286
TOTAL	1715 (286)	100%	PERCENT TRUCKS 17 %

Vanasse Hangen Brustlin, Inc.
60 Birmingham Parkway
Boston, Massachusetts 02135
617/783-7000

INTERSECTION TURNING MOVEMENT COUNT

CITY Boston DATE 6-20-88 DAY of WEEK Monday
INTERSECTION Southampton / I-93 N.B ON/OFF Ramp JOB No. 2177



STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT
Exit Ramp R-93 SB	378 (69)	34 %	PM Peak Hour 4:00 to 5:00 PM
Southampton WB	294 (37)	27 %	
Exit Ramp Rt 93 NB	0	0 %	Peak Hour Factor .90
Southampton EB	430 (44)	39 %	
			VEHICLES COUNTED
			ALL VEHICLES XXX 1102
			TRUCKS (XX) 170
TOTAL	1102 (170)	100%	PERCENT TRUCKS 15 %

Level of Service Analysis Results:

Location Number	Description
1	Albany Street and East Berkely Street
2	Albany Street and Malden Street
3	Albany Street and East Brookline Street
4	Albany Street and East Newton Street
5	Albany Street and East Concord Street
6	Harrison Avenue and East Concord Street
7	Washington Street and Massachusetts Avenue
8	Massachusetts Avenue and Harrison Avenue
9	Massachusetts Avenue and Albany Street
10	Massachusetts Avenue and Melnea Cass Boulevard
11	Southampton Street and I-93 Southbound Ramps
12	Southampton Street and I-93 Norhtbound Ramps
13	Massachusetts Avenue Connector and East Concord Street Extension

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND E.BERKLEY ST
EXISTING CONDITIONS AM PEAK HOUR
date:01-29-1991 time:10:57:53
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=albeexam GEOMETRICS=albeexam SIGNAL=albeexam
LOCATED IN CBD:N

VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	0	0	0	0	0	0	0.0	0.0	0.0	41
WB	148	1553	0	0	4	0	0.0	10.0	0.0	40
NB	0	0	0	0	0	0	0.0	0.0	0.0	64
SB	0	1041	227	0	3	1	0.0	10.0	9.0	64

TRAFFIC & ROADWAY CONDITIONS

			ADJ	PARK			PEDESTRIANS		ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT MIN TIME	TYPE
EB	0.0%	0.0%		0	0	.000	0	17.3	0
WB	0.0%	0.0%	N	0	0	.970	0	17.3	3
NB	0.0%	0.0%		0	0	.000	0	23.0	0
SB	0.0%	0.0%	N	0	0	.970	0	23.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1													*	*			24.0	4	P
2					*	*											66.0	4	P

CYCLE= 98.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	0	0	0	.000	0	0	0
WB	148	1553	0	.970	153	1601	0
NB	0	0	0	.000	0	0	0
SB	0	1041	227	.970	0	1073	234

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
WB	LT-TH	1754	4	1.10	1929	0.09	0.00
SB	TH	1073	3	1.10	1181	0.00	0.00
SB	RT	234	1	1.00	234	0.00	1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
WESTBOUND	0	0	0	0	0	0	0	0	0	0

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
WB	LT-TH	1800	4	0.933	1.000	1.000	1.000	1.000	1.000	1.000	1.000	6720
SB	TH	1800	3	0.933	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5040
SB	RT	1800	1	0.900	1.000	1.000	1.000	1.000	1.000	0.850	1.000	1377

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
WB	LT-TH	1929	6720	0.29	0.67	4526	0.43	*
SB	TH	1181	5040	0.23	0.24	1234	0.96	*
SB	RT	234	1377	0.17	0.24	337	0.69	

CYCLE= 98.0 LOST= 8.0 SUM V/S CRIT= 0.52 TOTAL V/C= 0.57

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
WB	LT-TH	0.43	0.67	98.0	5.57	4526	0.04	1.00	5.61	B	15.6	16
SB	TH	0.96	0.24	98.0	27.73	1234	12.03	1.00	39.76	D	22.9	36
SB	RT	0.69	0.24	98.0	25.58	337	4.14	1.00	29.73	D	4.8	7

DIR	Delay	LOS
WB	5.61	B
SB	38.10	D

INTERSECTION DELAY = 19.35 INTERSECTION LOS=C

THE CYCLE LENGTH WITHIN THE BOUNDS OF 98 TO 98 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 98.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 17.7 SECONDS
for chosen cycle length 98.0
suggested timing phase 1 is 40.4 secs green. 4.0 secs yellow + red clear
suggested timing phase 2 is 49.6 secs green. 4.0 secs yellow + red clear

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CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND E.BERKLEY ST
FUTURE 2000 NO-BUILD AM PEAK HOUR TIMINGS OPTIMIZED
date:03-01-1991              time:14:02:21
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALBENBAM  GEOMETRICS=ALBENBAM  SIGNAL=ALBENBAM
LOCATED IN CBD:N
VOLUME & GEOMETRICS
        VOLUMES       # OF LANES      LANE WIDTH      CROSS
DIR  LT   TH   RT     LT TH RT       LT   TH   RT     WALK
EB    0    0    0      0  0  0      0.0  0.0  0.0     41
WB   10 1455    0      0  4  0      0.0 10.0  0.0     40
NB    0    0    0      0  0  0      0.0  0.0  0.0     64
SB    0  735  230      0  3  1      0.0 10.0  9.0     64

TRAFFIC & ROADWAY CONDITIONS
                    ADJ PARK              PEDESTRIANS        ARR
DIR GRADE %HV    Y/N MOVES BUSES  PHF CROSS BUT MIN TIME TYPE
EB  0.0%  0.0%          0    0   .000    0        17.3    0
WB  0.0%  0.0%    N     0    0   .970    0        17.3    3
NB  0.0%  0.0%          0    0   .000    0        23.0    0
SB  0.0%  0.0%    N     0    0   .970    0        23.0    3

PHASINGS
    EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  Y+R PRE/ACT
    l  t  r  p  l  t  r  p  l  t  r  p  l  t  r  p
 1                                      *  *     37.0   4    P
 2              *  *                             53.0   4    P

CYCLE=  96.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTFR THFR RTFR
EB     0    0    0  .000     0    0    0
WB    10 1455    0  .970    10 1500    0
NB     0    0    0  .000     0    0    0
SB     0  735  230  .970     0  758  237

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Plt  Prt
WB  LT-TH     1510 4 1.10 1661 0.01 0.00
SB  TH         758 3 1.10  834 0.00 0.00
SB  RT         237 1 1.00  237 0.00 1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)
LEFT TURN                OPPOSING APPROACH
BEING OPPOSED       VOLUMES      % OPPOSING LEFT TURN    # LANES     OPPOSING
                  LT   TH   RT        LT   TH   RT       LT  TH  RT    VOLUME
WESTBOUND          0    0    0         0    0    0        0   0   0       0

SATURATION FLOW ADJUSTMENT WORKSHEET
DIR LN GROUP  IDEAL N  Fwid   Fhv   Fgr Fpark  Fbus Farea   Frt   Flt    s
WB  LT-TH     1800  4 0.933 1.000 1.000 1.000 1.000 1.000 1.000 1.000 6720
SB  TH        1800  3 0.933 1.000 1.000 1.000 1.000 1.000 1.000 1.000 5040
SB  RT        1800  1 0.900 1.000 1.000 1.000 1.000 1.000 0.850 1.000 1377

CAPACITY ANALYSIS WORKSHEET
DIR LN GROUP    v    s  v/s  g/C    c  v/c  CRITICAL
WB  LT-TH    1661 6720 0.25 0.54 3638 0.46     *
SB  TH        834 5040 0.17 0.38 1900 0.44
SB  RT        237 1377 0.17 0.38  519 0.46     *
```

CYCLE= 98.0 LOST= 8.0 SUM V/S CRIT= 0.42 TOTAL V/C= 0.46

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	o/C	C	d1	c	d2	PF	Delay	LOS	Avo Q	95% Q
WB	LT-TH	0.46	0.54	98.0	10.41	3638	0.07	1.00	10.47	B	18.9	19
SB	TH	0.44	0.38	98.0	17.32	1900	0.11	1.00	17.42	C	12.8	13
SB	RT	0.46	0.38	98.0	17.46	519	0.46	1.00	17.92	C	4.0	4

DIR	Delay	LOS
WB	10.47	B
SB	17.53	C

INTERSECTION DELAY = 13.24 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 98 TO 98 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 98.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 14.3 SECONDS
THE EXISTING TIMING IS OPTIMAL

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND E.BERKLEY ST
FUTURE BUILD [redacted] AM PEAK HOUR
date:03-04-1991 time:11:24:04
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALBEB[redacted]AM GEOMETRICS=ALBEB[redacted]AM SIGNAL=ALBEB[redacted]AM
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	0	0	0	0	0	0	0.0	0.0	0.0	41
WB	15	1455	0	0	4	0	0.0	10.0	0.0	40
NB	0	0	0	0	0	0	0.0	0.0	0.0	64
SB	0	750	230	0	3	1	0.0	10.0	9.0	64

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK			PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT MIN TIME	TYPE
EB	0.0%	0.0%		0	0	.000	0	17.3	0
WB	0.0%	0.0%	N	0	0	.970	0	17.3	3
NB	0.0%	0.0%		0	0	.000	0	23.0	0
SB	0.0%	0.0%	N	0	0	.970	0	23.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1													*	*			33.6	4	P
2					*	*											48.4	4	P

CYCLE= 90.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	0	0	0	.000	0	0	0
WB	15	1455	0	.970	15	1500	0
NB	0	0	0	.000	0	0	0
SB	0	750	230	.970	0	773	237

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
WB	LT-TH	1515	4	1.10	1667	0.01	0.00
SB	TH	773	3	1.10	851	0.00	0.00
SB	RT	237	1	1.00	237	0.00	1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
WESTBOUND	0	0	0	0	0	0	0	0	0	0

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
WB	LT-TH	1800	4	0.933	1.000	1.000	1.000	1.000	1.000	1.000	1.000	6720
SB	TH	1800	3	0.933	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5040
SB	RT	1800	1	0.900	1.000	1.000	1.000	1.000	1.000	0.850	1.000	1377

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	p/C	c	v/c	CRITICAL
WB	LT-TH	1667	6720	0.25	0.54	3614	0.46	*
SB	TH	851	5040	0.17	0.37	1881	0.45	
SB	RT	237	1377	0.17	0.37	514	0.46	*

CYCLE= 90.0 LOST= 6.0 SUM V/S CRIT= 0.42 TOTAL V/C= 0.46

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
WB	LT-TH	0.46	0.54	90.0	9.72	3614	0.07	1.00	9.79	B	17.5	16
SB	TH	0.45	0.37	90.0	16.16	1681	0.12	1.00	16.28	C	12.1	12
SB	RT	0.46	0.37	90.0	16.23	514	0.48	1.00	16.71	C	3.7	4

DIR	Delay	LOS
WB	9.79	B
SB	16.36	C

INTERSECTION DELAY = 12.39 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 90 TO 90 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 90.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 14.3 SECONDS
THE EXISTING TIMING IS OPTIMAL

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND E.BERKLEY ST
EXISTING CONDITIONS PM PEAK HOUR
date:01-29-1991 time:10:55:57
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=albeexom GEOMETRICS=albeexom SIGNAL=albeexom
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	0	0	0	0	0	0	0.0	0.0	0.0	41
WB	208	800	0	1	3	0	10.0	10.0	0.0	40
NB	0	0	0	0	0	0	0.0	0.0	0.0	64
SB	0	1882	217	0	3	1	0.0	10.0	9.0	64

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS		ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT MIN TIME	TYPE
EB	0.0%	0.0%		0	0	.000	0	17.3	0
WB	0.0%	0.0%	N	0	0	.910	0	17.3	3
NB	0.0%	0.0%		0	0	.000	0	23.0	0
SB	0.0%	0.0%	N	0	0	.910	0	23.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1														*	*		37.0	3	P
2					*	*											46.0	4	P

CYCLE= 90.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	0	0	0	.000	0	0	0
WB	208	800	0	.910	229	879	0
NB	0	0	0	.000	0	0	0
SB	0	1882	217	.910	0	2068	238

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	PIt	Prt
WB	LT	229	1	1.00	229	1.00	0.00
WB	TH	879	3	1.10	967	0.00	0.00
SB	TH	2068	3	1.10	2275	0.00	0.00
SB	RT	238	1	1.00	238	0.00	1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
WESTBOUND	0	0	0	0	0	0	0	0	0	0

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
WB	LT	1800	1	0.933	1.000	1.000	1.000	1.000	1.000	1.000	0.950	1596
WB	TH	1800	3	0.933	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5040
SB	TH	1800	3	0.933	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5040
SB	RT	1800	1	0.900	1.000	1.000	1.000	1.000	1.000	0.850	1.000	1377

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
WB	LT	229	1596	0.14	0.51	816	0.28	
WB	TH	967	5040	0.19	0.51	2576	0.38	*

```
SB  TH       2275 5040 0.45 0.41 2072 1.10     *
SB  RT        238 1377 0.17 0.41  566 0.42

CYCLE= 90.0  LOST= 7.0  SUM V/S CRIT= 0.64 TOTAL V/C= 0.70

LEVEL OF SERVICE WORKSHEET
DIR LN GROUP  v/c  o/C   C     d1    c      d2   PF   Delay LOS Avg Q  95% Q
WB  LT       0.28 0.51  90.0   9.54  816    0.05 1.00    9.59  B   2.8    3
WB  TH       0.38 0.51  90.0  10.12 2576    0.05 1.00   10.16  B  10.7   11
SB  TH       1.10 0.41  90.0  21.62 2072   48.46 1.00   70.08  F  55.5  122
SB  RT       0.42 0.41  90.0  14.34  566    0.31 1.00   14.66  B   3.5    4

DIR Delay LOS
WB  10.05  B
SB  64.82  F
INTERSECTION DELAY = 47.17 INTERSECTION LOS=E

THE CYCLE LENGTH WITHIN THE BOUNDS OF  90  TO  90 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS  90.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE  21.7 SECONDS
for chosen cycle length  90.0
suggested timing phase 1 is  58.2 secs green,   3.0 secs yellow + red clear
suggested timing phase 2 is  24.8 secs green,   4.0 secs yellow + red clear
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2INCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND E.BERKLEY ST
FUTURE 2000 NO-BUILD PM PEAK HOUR TIMINGS OPTIMIZED
date:01-30-1991              time:09:05:20
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALBENBPM   GEOMETRICS=ALBENBPM   SIGNAL=ALBENBPM
LOCATED IN CBD:N
VOLUME & GEOMETRICS
        VOLUMES       # OF LANES      LANE WIDTH      CROSS
DIR  LT   TH   RT    LT TH RT      LT   TH   RT     WALK
EB    0    0    0     0  0  0     0.0  0.0  0.0     41
WB  390  720    0     0  4  0     0.0 10.0  0.0     40
NB    0    0    0     0  0  0     0.0  0.0  0.0     64
SB    0  880  215     0  3  1     0.0 10.0  9.0     64

TRAFFIC & ROADWAY CONDITIONS
                   ADJ PARK              PEDESTRIANS        ARR
DIR GRADE %HV   Y/N MOVES BUSES  PHF CROSS BUT MIN TIME TYPE
EB  0.0%  0.0%        0    0   .000    0        17.3    0
WB  0.0%  0.0%   N    0    0   .910    0        17.3    3
NB  0.0%  0.0%        0    0   .000    0        23.0    0
SB  0.0%  0.0%   N    0    0   .910    0        23.0    3

PHASINGS
    EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  Y+R PRE/ACT
    l t r p l t r p l t r p l t r p
 1                                      *  *     42.7   3    P
 2             *  *                              40.3   4    P

CYCLE=  90.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTFR THFR RTFR
EB     0    0    0  .000     0    0    0
WB   390  720    0  .910   429  791    0
NB     0    0    0  .000     0    0    0
SB     0  880  215  .910     0  967  236

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Plt  Prt
WB  LT-TH     1220 4 1.10 1342 0.35 0.00
SB  TH         967 3 1.10 1064 0.00 0.00
SB  RT         236 1 1.00  236 0.00 1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)
LEFT TURN                OPPOSING APPROACH
BEING OPPOSED       VOLUMES       % OPPOSING LEFT TURN    # LANES     OPPOSING
                  LT   TH   RT        LT   TH   RT       LT  TH  RT    VOLUME
WESTBOUND          0    0    0         0    0    0        0   0   0       0

SATURATION FLOW ADJUSTMENT WORKSHEET
DIR LN GROUP  IDEAL N  Fwid   Fhv   Fgr Fsart Fbus Farea  Frt   Flt    s
WB  LT-TH     1800  4 0.933 1.000 1.000 1.000 1.000 1.000 1.000 1.000 6720
SB  TH        1800  3 0.933 1.000 1.000 1.000 1.000 1.000 1.000 1.000 5040
SB  RT        1800  1 0.900 1.000 1.000 1.000 1.000 1.000 0.850 1.000 1377

CAPACITY ANALYSIS WORKSHEET
DIR LN GROUP    v    s  v/s  g/C    c  v/c  CRITICAL
WB  LT-TH    1342 6720 0.20 0.45 3013 0.45     *
SB  TH       1064 5040 0.21 0.47 2368 0.45     *
SB  RT        236 1377 0.17 0.47  653 0.36
```

CYCLE= 90.0 LOST= 7.0 SUM V/S CRIT= 0.41 TOTAL V/C= 0.45

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	o/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
WB	LT-TH	0.45	0.45	90.0	13.01	3013	0.07	1.00	13.08	B	16.8	17
SB	TH	0.45	0.47	90.0	12.00	2388	0.09	1.00	12.09	B	12.7	13
SB	RT	0.36	0.47	90.0	11.43	653	0.16	1.00	11.58	B	3.1	3

DIR	Delay	LOS
WB	13.08	B
SB	12.00	B

INTERSECTION DELAY = 12.55 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 90 TO 90 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 90.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 12.3 SECONDS
THE EXISTING TIMING IS OPTIMAL

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND E.BERKLEY ST
FUTURE BUILD [redacted] PM PEAK HOUR
date:03-04-1991 time:11:29:16
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALBEB#PM GEOMETRICS=ALBEB#PM SIGNAL=ALBEB#PM
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	0	0	0	0	0	0	0.0	0.0	0.0	41
WB	390	720	0	0	4	0	0.0	10.0	0.0	40
NB	0	0	0	0	0	0	0.0	0.0	0.0	64
SB	0	885	215	0	3	1	0.0	10.0	9.0	64

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK			PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT MIN TIME	TYPE
EB	0.0%	0.0%		0	0	.000	0	17.3	0
WB	0.0%	0.0%	N	0	0	.910	0	17.3	3
NB	0.0%	0.0%		0	0	.000	0	23.0	0
SB	0.0%	0.0%	N	0	0	.910	0	23.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1														*	*		46.9	3	P
2					*	*											44.1	4	P

CYCLE= 98.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	0	0	0	.000	0	0	0
WB	390	720	0	.910	429	791	0
NB	0	0	0	.000	0	0	0
SB	0	885	215	.910	0	973	236

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	PIt	Prt
WB	LT-TH	1220	4	1.10	1342	0.35	0.00
SB	TH	973	3	1.10	1070	0.00	0.00
SB	RT	236	1	1.00	236	0.00	1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
WESTBOUND	0	0	0	0	0	0	0	0	0	0

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	FIt	s
WB	LT-TH	1800	4	0.933	1.000	1.000	1.000	1.000	1.000	1.000	1.000	6720
SB	TH	1800	3	0.933	1.000	1.000	1.000	1.000	1.000	1.000	1.000	5040
SB	RT	1800	1	0.900	1.000	1.000	1.000	1.000	1.000	0.850	1.000	1377

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
WB	LT-TH	1342	6720	0.20	0.45	3025	0.44	*
SB	TH	1070	5040	0.21	0.48	2412	0.44	*
SB	RT	236	1377	0.17	0.48	659	0.36	

CYCLE= 98.0 LOST= 7.0 SUM V/S CRIT= 0.41 TOTAL V/C= 0.44

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	c/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
WB	LT-TH	0.44	0.45	95.0	14.07	3025	0.07	1.00	14.14	B	13.3	13
SB	TH	0.44	0.48	98.0	12.86	2412	0.09	1.00	12.95	B	13.8	14
SB	RT	0.36	0.48	98.0	12.23	659	0.15	1.00	12.38	B	3.4	3

DIR	Delay	LOS
WB	14.14	B
SB	12.84	B

INTERSECTION DELAY = 13.50 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 98 TO 98 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 98.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 12.4 SECONDS
THE EXISTING TIMING IS OPTIMAL

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TINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)
DATE:01-29-1991            TIME:10:17:15
ALBANY AND MALDEN ST EXISTING AM


LAST DATASETS LOADED OR SAVED
VOLUME=alalexam   GEOMETRICS=alalexam
KEY: A- -B
       :
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM C RT LANE: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: C: MALDEN ST
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO


SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: MALDEN ST
LEFTS             0.00           0.00           0.00
THRUS             0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: MALDEN ST
                 LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME            0  687  306  144  432    0  128    0    6
PHF              0.95           0.95           0.95
ADJ VOLUME        0  723  322  152  455    0  135    0    6
PERCENT GRADE    0.00           0.00           0.00
PERCENT CYCLES    0.00           0.00           0.00
PASSENGER CARS   93.00          89.00          83.00
PERCENT LT TRU    7.00          11.00          17.00
PERCENT HV TRU    0.00           0.00           0.00
PASS CAR/HR       0            160            146    0    7


STEP 1 RIGHT TURNS FROM     C:MALDEN ST
CONFLICTING FLOWS                    884
CRITICAL GAPS                        5.0
CAPACITY                             458
ACTUAL CAPACITY                      458


STEP 2 LEFT TURNS FROM      B:ALBANY NB
CONFLICTING FLOWS                   1045
CRITICAL GAPS                        4.5
CAPACITY                             458
CAPACITY USED                         35%
IMPEDANCE FACTOR                     0.73
ACTUAL CAPACITY                      458
```

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 2 of 2)
DATE:01-29-1991 TIME:10:17:15
ALBANY AND MALDEN ST EXISTING AM

STEP 3 LEFT TURNS FROM C:MALDEN ST

CONFLICTING FLOWS	1491
CRITICAL GAPS	6.0
CAPACITY	126
ACTUAL CAPACITY	92

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	160	458	298	C	12.06	0.54
LT FROM C:	146	92	-55	F	INFINITE	INFINITE
RT FROM C:	7	458	451	A	7.98	0.32

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)
DATE:03-01-1991 TIME:15:20:32
ALBANY AND MALDEN ST FUTURE NO-BUILD AM

LAST DATASETS LOADED OR SAVED
VOLUME=ALMLNBAM GEOMETRICS=ALMLNBAM
KEY: A- -B
:
C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250.000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: STOP
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: C: MALDEN ST
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: ALBANY SB	B: ALBANY NB	C: MALDEN ST
LEFTS	0.00	0.00	0.00
THRUS	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00

APPROACH	A: ALBANY SB			B: ALBANY NB			C: MALDEN ST		
	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	810	330	145	490	0	210	0	10
PHF	0.95			0.95			0.95		
ADJ VOLUME	0	853	347	153	516	0	221	0	11
PERCENT GRADE	0.00			0.00			0.00		
PERCENT CYCLES	0.00			0.00			0.00		
PASSENGER CARS	93.00			89.00			83.00		
PERCENT LT TRU	7.00			11.00			17.00		
PERCENT HV TRU	0.00			0.00			0.00		
PASS CAR/HR	0			161			240	0	11

STEP 1 RIGHT TURNS FROM C:MALDEN ST

CONFLICTING FLOWS	1026
CRITICAL GAPS	5.0
CAPACITY	384
ACTUAL CAPACITY	384

STEP 2 LEFT TURNS FROM B:ALBANY NB

CONFLICTING FLOWS	1200
CRITICAL GAPS	4.5
CAPACITY	382
CAPACITY USED	422
IMPEDANCE FACTOR	0.65
ACTUAL CAPACITY	382

DATE:03-01-1991 TIME:15:20:32
ALBANY AND MALDEN ST FUTURE NO-BUILD AM

STEP 3 LEFT TURNS FROM C:MALDEN ST

CONFLICTING FLOWS	1655
CRITICAL GAPS	6.0
CAPACITY	89
ACTUAL CAPACITY	58

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	161	382	221	C	16.30	0.73
LT FROM C:	240	58	-182	F	INFINITE	INFINITE
RT FROM C:	11	384	373	B	9.66	0.64

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[illegible] PROGRAM VERSION DATE [illegible]
[illegible] - CHAPTER [illegible] - [illegible] PAGE 1 OF 2
DATE:[illegible]                TIME:[illegible]
ALBANY AND MALDEN ST FUTURE [illegible]


LAST DATASETS LOADED OR SAVED
VOLUME=ALMLBAM    GEOMETRICS=ALMLBAM
KEY: A- -B
       [illegible]
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM C RT LANE: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: C: MALDEN ST
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO


SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: MALDEN ST
LEFTS             0.00           0.00           0.00
THRUS             0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: MALDEN ST
                 LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME            0  855  330  145  510    0  210    0   20
PHF               0.95           0.95           0.95
ADJ VOLUME        0  900  347  153  537    0  221    0   21
PERCENT GRADE     0.00           0.00           0.00
PERCENT CYCLES      0.00           0.00           0.00
PASSENGER CARS     93.00          89.00          83.00
PERCENT LT TRU      7.00          11.00          17.00
PERCENT HV TRU      0.00           0.00           0.00
PASS CAR/HR       0             161            240    0   23


STEP 1 RIGHT TURNS FROM     C:MALDEN ST
CONFLICTING FLOWS                    1074
CRITICAL GAPS                         5.5
CAPACITY                              297
ACTUAL CAPACITY                       297


STEP 2 LEFT TURNS FROM      B:ALBANY NB
CONFLICTING FLOWS                    1247
CRITICAL GAPS                         5.0
CAPACITY                              258
CAPACITY USED                          56%
IMPEDANCE FACTOR                     0.32
ACTUAL CAPACITY                       258
```

[illegible] - CHAPTER [illegible] : UNSIGNALIZED - [illegible] APPROACHES PAGE [illegible] OF [illegible]
DATE:04-[illegible]-1991 TIME:[illegible]
ALBANY AND MALDEN ST FUTURE BUILD AM

STEP 3 LEFT TURNS FROM C:MALDEN ST

CONFLICTING FLOWS	17[illegible]
CRITICAL GAPS	[illegible].5
CAPACITY	[illegible]
ACTUAL CAPACITY	[illegible]

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	1[illegible]1	2[illegible]	127	D	2[illegible].[illegible]1	1.27
LT FROM C:	24[illegible]	[illegible]1	-20[illegible]	F	INFINITE	INFINITE
RT FROM C:	2[illegible]	2[illegible]	274	C	1[illegible].14	[illegible].[illegible]

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)
DATE:01-29-1991 TIME:10:19:25
ALBANY AND MALDEN ST EXISTING PM

LAST DATASETS LOADED OR SAVED
VOLUME=alalexca GEOMETRICS=alalexca
KEY: A- -B
:
C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250.000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: STOP
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: C: MALDEN ST
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: ALBANY SB	B: ALBANY NB	C: MALDEN ST
LEFTS	0.00	0.00	0.00
THRUS	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00

APPROACH	A: ALBANY SB			B: ALBANY NB			C: MALDEN ST		
	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	565	213	114	700	0	211	0	10
PHF	0.78			0.78			0.78		
ADJ VOLUME	0	724	273	146	897	0	271	0	13
PERCENT GRADE	0.00			0.00			0.00		
PERCENT CYCLES	0.00			0.00			0.00		
PASSENGER CARS	95.00			98.00			83.00		
PERCENT LT TRU	5.00			2.00			17.00		
PERCENT HV TRU	0.00			0.00			0.00		
PASS CAR/HR	0			148			294	0	14

STEP 1 RIGHT TURNS FROM C:MALDEN ST

CONFLICTING FLOWS	861
CRITICAL GAPS	5.0
CAPACITY	471
ACTUAL CAPACITY	471

STEP 2 LEFT TURNS FROM B:ALBANY NB

CONFLICTING FLOWS	997
CRITICAL GAPS	4.5
CAPACITY	484
CAPACITY USED	30%
IMPEDANCE FACTOR	0.77
ACTUAL CAPACITY	484

DATE:01-29-1991 TIME:10:19:25
ALBANY AND MALDEN ST EXISTING PM

STEP 3 LEFT TURNS FROM	C:MALDEN ST
CONFLICTING FLOWS	1904
CRITICAL GAPS	6.0
CAPACITY	60
ACTUAL CAPACITY	46

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	148	484	337	B	10.70	0.44
LT FROM C:	294	46	-247	F	INFINITE	INFINITE
RT FROM C:	14	471	457	A	7.88	0.64

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)
DATE:01-29-1991 TIME:15:16:58
ALBANY AND MALDEN ST FUTURE NO-BUILD PM

LAST DATASETS LOADED OR SAVED
VOLUME=ALMLNBPM GEOMETRICS=ALMLNBPM
KEY: A- -B
:
C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250.000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: STOP
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: C: MALDEN ST
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: ALBANY SB	B: ALBANY NB	C: MALDEN ST
LEFTS	0.00	0.00	0.00
THRUS	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00

APPROACH	A: ALBANY SB			B: ALBANY NB			C: MALDEN ST		
	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	600	240	115	835	0	270	0	10
PHF	0.78			0.78			0.78		
ADJ VOLUME	0	769	308	147	1071	0	346	0	13
PERCENT GRADE	0.00			0.00			0.00		
PERCENT CYCLES	0.00			0.00			0.00		
PASSENGER CARS	95.00			98.00			83.00		
PERCENT LT TRU	5.00			2.00			17.00		
PERCENT HV TRU	0.00			0.00			0.00		
PASS CAR/HR	0			149			376	0	14

STEP 1 RIGHT TURNS FROM C:MALDEN ST

CONFLICTING FLOWS	923
CRITICAL GAPS	5.0
CAPACITY	437
ACTUAL CAPACITY	437

STEP 2 LEFT TURNS FROM B:ALBANY NB

CONFLICTING FLOWS	1077
CRITICAL GAPS	4.5
CAPACITY	442
CAPACITY USED	34%
IMPEDANCE FACTOR	0.74
ACTUAL CAPACITY	442

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 2 of 2)
DATE:01-29-1991 TIME:15:16:58
ALBANY AND MALDEN ST FUTURE NO-BUILD PM

STEP 3 LEFT TURNS FROM	C:MALDEN ST
CONFLICTING FLOWS	2141
CRITICAL GAPS	6.0
CAPACITY	37
ACTUAL CAPACITY	28

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	149	442	293	C	12.29	0.51
LT FROM C:	376	28	-348	F	INFINITE	INFINITE
RT FROM C:	14	437	423	A	8.52	0.89

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CODE: PROGRAM "BASIC" V- 8 [illegible]
TRB HCM - CHAPTER 10 : UNSIGNALIZED - 2 APPROACHES  PAGE 1 OF 1
DATE:[illegible]-1991              TIME:[illegible]
ALBANY AND MALDEN ST FUTURE 2010 PM


LAST DATASETS LOADED IN BAYES
VOLUME=ALMLBF04   GEOMETRICS=ALMLBF04
YEN: 4- -5

      C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM D RT LANE: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: D: MALDEN ST
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE OR BADGE: NO


SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: MALDEN ST
LEFTS             0.00           0.00           0.00
THRUS             0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: MALDEN ST
                LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME           0  610  240  120  835    0  270    0   10
PHF              0.78           0.73           0.78
ADJ VOLUME       0  782  308  164 1071    0  346    0   13
PERCENT GRADE    0.00           0.00           0.00
PERCENT CYCLES     0.00           0.00           0.00
PASSENGER CARS    95.00          98.00          83.00
PERCENT LT TRU     5.00           2.00          17.00
PERCENT HV TRU     0.00           0.00           0.00
PASS CAR/HR      0            155            376    0   14


STEP 1 RIGHT TURNS FROM     C:MALDEN ST
CONFLICTING FLOWS                     936
CRITICAL GAPS                         5.5
CAPACITY                              355
ACTUAL CAPACITY                       355


STEP 2 LEFT TURNS FROM      B:ALBANY NB
CONFLICTING FLOWS                    1090
CRITICAL GAPS                         5.0
CAPACITY                              351
CAPACITY USED                          44%
IMPEDANCE FACTOR                      .64
ACTUAL CAPACITY                       334
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USER [illegible] - CHAPTER [illegible] : [illegible] - [illegible] APPROACHES PAGE [illegible]
DATE: [illegible] TIME: [illegible]
ALBANY AND MALDEN ST FUTURE BUILD [illegible]

STEP 2 LEFT TURNS FROM C:MALDEN ST

CONFLICTING FLOWS	[illegible]
CRITICAL GAPS	6.5
CAPACITY	[illegible]
ACTUAL CAPACITY	[illegible]

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	155	354	199	D	15.10	0.76
LT FROM C:	[illegible]	17	-359	F	INFINITE	INFINITE
RT FROM C:	14	358	344	B	10.45	1.09

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[illegible] PROGRAM VERSION DATE [illegible]
[illegible] - [illegible] 10: UNSIGNALIZED - - APPROACHES  PAGE [illegible]
DATE:[illegible]                TIME:[illegible]
ALBANY/BROOKLINE EXISTING AM


LAST DATASETS LOADED OF SAVED
VOLUME=ALBREXAM   GEOMETRICS=ALBREXAM
KEY:   B
       .
     A- -B
       .
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM D: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: BROOKLINE EB
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: SITE DRIVE
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: BROOKLINE E D: SITE DRIVE
LEFTS             0.00           0.00           0.00           0.00
THRUS             0.00           0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: BROOKLINE E D: SITE DRIVE
                LT   TH   RT   LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME          141  319    0    0  458  210   64   10  104   10    0    5
PHF               0.95           0.95           0.95           0.95
ADJ VOLUME      148  336    0    0  482  221   67   11  109   11    0    5
PERCENT GRADE     0.00           0.00           0.00
PASS CAR/HR     163              0              74   12  120   12    0    6


STEP 1 RIGHT TURNS FROM     C:BROOKLINE EB          D:SITE DRIVE
CONFLICTING FLOWS                  336                  593
CRITICAL GAPS                      5.0                  5.0
CAPACITY                           853                  644
CAPACITY USED                       142                   1%
IMPEDANCE FACTOR                   0.91                 1.00
ACTUAL CAPACITY                    853                  644
```

1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES PAGE 2 OF 2
DATE:04-19-1991 TIME:10:55:11
ALBANY/BROOKLINE EXISTING AM

STEP 2 LEFT TURNS FROM	B:ALBANY NB	A:ALBANY EB
CONFLICTING FLOWS	336	703
CRITICAL GAPS	4.5	4.5
CAPACITY	964	668
CAPACITY USED	0%	24%
IMPEDANCE FACTOR	1.00	0.82
ACTUAL CAPACITY	964	668

STEP 3 THRU MOVES FROM	C:BROOKLINE EB	D:SITE DRIVE
CONFLICTING FLOWS	1157	1077
CRITICAL GAPS	5.5	5.5
CAPACITY	253	295
CAPACITY USED	5%	0%
IMPEDANCE FACTOR	0.98	1.00
ACTUAL CAPACITY	208	243

STEP 4 LEFT TURNS FROM	C:BROOKLINE EB	D:SITE DRIVE
CONFLICTING FLOWS	1193	1197
CRITICAL GAPS	6.0	6.0
CAPACITY	204	203
ACTUAL CAPACITY	167	146

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	163	668	505	A	7.14	0.32
ALL MOVES FROM C:	206	322	116	D	31.11	1.78
ALL MOVES FROM D:	17	199	181	D	19.86	0.10

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CINCH PROGRAM  VERSION DATE 4-29-1988
1985 HCM - CHAPTER 11: UNSIGNALIZED - 4 APPROACHES  PAGE 1 OF 2
DATE:04-19-1991                TIME:10:17:24
ALBANY AND E. BROOKLINE ST NO-BUILD AM PEAK HOUR


LAST DATASETS LOADED OR SAVED
VOLUME=ALBRNBAM   GEOMETRICS=ALBRNBAM
KEY:   D
        |
     A- -B
        |
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM D: STOP
          FROM D RT LANE: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: EAST BROOKLINE
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: SITE DRIVE
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: EAST BROOKL D: SITE DRIVE
LEFTS             0.00           0.00           0.00           0.00
THRUS             0.00           0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: EAST BROOKL D: SITE DRIVE
                 LT   TH   RT   LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME          210  425    0    0  545  140   65   10  105   10    0    5
PHF               0.95           0.95           0.95           0.95
ADJ VOLUME      221  447    0    0  574  147   68   11  111   11    0    5
PERCENT GRADE     0.00           0.00           0.00
PASS CAR/HR     243              0              75   12  122   12    0    6


STEP 1 RIGHT TURNS FROM     C:EAST BROOKLINE        D:SITE DRIVE
CONFLICTING FLOWS                   447                  647
CRITICAL GAPS                       5.0                  5.0
CAPACITY                            757                  605
CAPACITY USED                        15%                   1%
IMPEDANCE FACTOR                    0.89                 1.00
ACTUAL CAPACITY                     757                  605
```

1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 2 OF 3)
DATE:04-19-1991 TIME:10:7:34
ALBANY PKD E. BROOKLINE ST NO-BUILD AM PEAK HOUR

STEP 2 LEFT TURNS FROM	B:ALBANY NB	A:ALBANY SB
CONFLICTING FLOWS	447	721
CRITICAL GAPS	4.5	4.5
CAPACITY	866	655
CAPACITY USED	0%	37%
IMPEDANCE FACTOR	1.00	0.79
ACTUAL CAPACITY	866	635

STEP 3 THRU MOVES FROM	C:EAST BROOKLINE	D:SITE DRIVE
CONFLICTING FLOWS	1389	1316
CRITICAL GAPS	5.5	5.5
CAPACITY	188	210
CAPACITY USED	6%	0%
IMPEDANCE FACTOR	0.97	1.00
ACTUAL CAPACITY	172	146

STEP 4 LEFT TURNS FROM	C:EAST BROOKLINE	D:SITE DRIVE
CONFLICTING FLOWS	1595	1437
CRITICAL GAPS	6.0	6.0
CAPACITY	146	136
ACTUAL CAPACITY	104	84

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DELAY(SEC)	AVG QUEUE
LT FROM A:	243	655	412	A	8.73	0.59
LT FROM C:	75	104	29	E	125.90	2.63
SHARED TH/RT FROM C:	133	536	403	A	8.93	0.33
LT FROM D:	12	84	72	E	45.84	0.16
RT FROM D:	6	605	600	A	6.00	0.01

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CINCH PROGRAM VERSION DATE 4-19-1985
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2
DATE:04-19-1991                TIME:13:21:15
ALBANY AND E.BROOKLINE ST BUILD AM PEAK  HOUR


LAST DATASETS LOADED OR SAVED
VOLUME=ALBRBAM    GEOMETRICS=ALBRBAM
KEY:   D
       :
     A- -B
       :
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM D: STOP
          FROM D RT LANE: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: EAST BROOKLINE
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: SITE DRIVE
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY STRE C: EAST BROOKL D: SITE DRIVE
LEFTS             0.00           0.00           0.00           0.00
THRUS             0.00           0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY STRE C: EAST BROOKL D: SITE DRIVE
                LT   TH   RT   LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME          265  445    0    0  560  295   65   10  105   20    0   15
PHF               0.95           0.95           0.95           0.95
ADJ VOLUME      279  468    0    0  589  311   68   11  111   21    0   16
PERCENT GRADE     0.00           0.00           0.00
PASS CAR/HR     307              0              75   12  122   23    0   17


STEP 1 RIGHT TURNS FROM     C:EAST BROOKLINE         D:SITE DRIVE
CONFLICTING FLOWS                    468                 745
CRITICAL GAPS                        5.0                 5.0
CAPACITY                             740                 541
CAPACITY USED                        16%                  3%
IMPEDANCE FACTOR                    0.89                0.98
ACTUAL CAPACITY                      74[illegible]                541
```

1985 HCM - CHAPTER 11: UNSIGNALIZED - 4 APPROACHES PAGE 2 OF 2
DATE:04-19-1991 TIME:10:21:15
ALBANY AND E.BROOKLINE ST BUILD AM PEAK HOUR

STEP 2 LEFT TURNS FROM	B:ALBANY STREET	A:ALBANY SS
CONFLICTING FLOWS	468	900
CRITICAL GAPS	4.5	4.5
CAPACITY	848	540
CAPACITY USED	0%	57%
IMPEDANCE FACTOR	1.00	0.51
ACTUAL CAPACITY	848	540

STEP 3 THRU MOVES FROM	C:EAST BROOKLINE	D:SITE DRIVE
CONFLICTING FLOWS	1647	1492
CRITICAL GAPS	5.5	5.5
CAPACITY	125	160
CAPACITY USED	9%	0%
IMPEDANCE FACTOR	0.94	1.00
ACTUAL CAPACITY	83	81

STEP 4 LEFT TURNS FROM	C:EAST BROOKLINE	D:SITE DRIVE
CONFLICTING FLOWS	1663	1613
CRITICAL GAPS	6.0	6.0
CAPACITY	94	102
ACTUAL CAPACITY	47	43

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	307	540	233	C	15.43	1.32
LT FROM C:	75	47	-29	F	INFINITE	INFINITE
SHARED TH/RT FROM C:	133	383	250	C	14.39	0.53
LT FROM D:	23	43	20	E	177.04	1.14
RT FROM D:	17	541	523	A	6.88	0.03

CINCH PROGRAM VERSION DATE 4-19-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY STREET AND E. BROOKLINE ST/SITE DRIVE
BUILD MITIGATED AM PEAK HOUR
date:04-19-1991 time:13:29:19
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALBRBMAM GEOMETRICS=ALBRBMAM SIGNAL=ALBRBMAM
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	65	10	105	1	1	0	12.0	12.0	0.0	0
WB	15	0	10	1	0	1	12.0	0.0	12.0	0
NB	0	545	325	0	1	0	0.0	12.0	0.0	0
SB	120	415	0	0	1	0	0.0	12.0	0.0	0

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	0.0%	N	0	0	.950	0		7.0	3
WB	0.0%	0.0%	N	0	0	.950	0		7.0	3
NB	0.0%	0.0%	N	0	0	.950	0		7.0	3
SB	0.0%	0.0%		0	0	.950	0		7.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	b	l	t	r	b	l	t	r	b	l	t	r	b			
1	*	*	*		*	*	*										7.7	3	A
2										*	*		*	*			55.3	3	A

CYCLE= 70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	65	10	105	.950	68	11	111
WB	15	0	10	.950	16	0	11
NB	0	545	325	.950	0	574	342
SB	120	415	0	.950	126	437	0

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	68	1	1.00	68	1.00	0.00
EB	TH-RT	121	1	1.00	121	0.00	0.91
WB	LT	16	1	1.00	16	1.00	0.00
WB	RT	11	1	1.00	11	0.00	1.00
NB	TH-RT	916	1	1.00	916	0.00	0.37
SB	LT-TH	563	1	1.00	563	0.22	0.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	16	0	11	100	100	0	1	0	1	0
WESTBOUND	68	11	111	100	100	100	1	1	0	121
SOUTHBOUND	0	574	342	100	100	100	0	1	0	916

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT	1800	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.950	1710
EB	TH-RT	1800	1	1.000	1.000	1.000	1.000	1.000	1.000	0.862	1.000	1553
WB	LT	1800	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.815	1468
WB	RT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

| | | |

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CINCH PROGRAM VERSION DATE 4-19-1988
1985 HCM - CHAPTER 10: UNSIGN-LIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:04-22-1991              TIME:08:02:15
ALBANY/BROOKLINE EXISTING PM


LAST DATASETS LOADED OR SAVED
VOLUME=ALBREXPM   GEOMETRICS=ALBREXPM
KEY:   D
       :
     A- -E
       :
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM D: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: BROOKLINE EB
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: SITE DRIVE
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: BROOKLINE E D: SITE DRIVE
LEFTS             0.00           0.00           0.00           0.00
THRUS             0.00           0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: BROOKLINE E D: SITE DRIVE
                LT   TH   RT   LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME          20  174    0    0  339   35   49    5  100  120    0   80
PHF              0.95           0.95           0.95           0.95
ADJ VOLUME      21  183    0    0  357   37   52    5  105  126    0   84
PERCENT GRADE    0.00           0.00           0.00
PASS CAR/HR     23              0              57    6  116  139    0   93


STEP 1 RIGHT TURNS FROM     C:BROOKLINE EB          D:SITE DRIVE
CONFLICTING FLOWS                    183                 375
CRITICAL GAPS                        5.0                 5.0
CAPACITY                            1000                 818
CAPACITY USED                         12%                 11%
IMPEDANCE FACTOR                    0.93                0.93
ACTUAL CAPACITY                     1000                 818
```

1988 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES PAGE 1 OF 1
DATE: 4-22-1991 TIME: 08:02:15
ALBANY:BROOKLINE EXISTING PM

STEP 2 LEFT TURNS FROM	B:ALBANY NB	A:ALBANY SB
CONFLICTING FLOWS	183	394
CRITICAL GAPS	4.5	4.5
CAPACITY	1112	512
CAPACITY USED	0%	3%
IMPEDANCE FACTOR	1.00	0.99
ACTUAL CAPACITY	1112	512

STEP 3 THRU MOVES FROM	C:BROOKLINE EB	D:SITE DRIVE
CONFLICTING FLOWS	592	575
CRITICAL GAPS	5.5	5.5
CAPACITY	554	567
CAPACITY USED	1%	0%
IMPEDANCE FACTOR	1.00	1.00
ACTUAL CAPACITY	548	561

STEP 4 LEFT TURNS FROM	C:BROOKLINE EB	D:SITE DRIVE
CONFLICTING FLOWS	681	590
CRITICAL GAPS	6.0	6.0
CAPACITY	403	426
ACTUAL CAPACITY	395	389

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	23	512	489	A	4.05	0.03
ALL MOVES FROM C:	175	661	432	A	7.46	0.37
ALL MOVES FROM D:	232	492	260	C	13.83	0.89

```
CINCH PROGRAM VERSION DATE 4-29-1985
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:04-22-1991              TIME:08:09:36
ALBANY AND E. BROOKLINE ST NO-BUILD PM PEAK HOUR


LAST DATASETS LOADED OR SAVED
VOLUME=ALBRNBPM   GEOMETRICS=ALBRNBPM
KEY:   D
        .
     A- -B
        .
        C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM D: STOP
          FROM D RT LANE: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: EAST BROOKLINE
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: SITE DRIVE
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY STRE C: EAST BROOKL D: SITE DRIVE
LEFTS             0.00           0.00           0.00           0.00
THRUS             0.00           0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY STRE C: EAST BROOKL D: SITE DRIVE
                LT   TH   RT   LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME          35  315    0    0  440   20   55    5  100   80    0  120
PHF              0.95           0.95           0.95           0.95
ADJ VOLUME      37  332    0    0  463   21   58    5  105   84    0  126
PERCENT GRADE    0.00           0.00           0.00
PASS CAR/HR     41              0              64    6  116   93    0  139


STEP 1 RIGHT TURNS FROM     C:EAST BROOKLINE        D:SITE DRIVE
CONFLICTING FLOWS                  332                  474
CRITICAL GAPS                      5.0                  5.0
CAPACITY                           857                  735
CAPACITY USED                       14%                  19%
IMPEDANCE FACTOR                  0.91                 0.87
ACTUAL CAPACITY                    857                  735
```

1985 HCM - CHAPTER 11: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 1
DATE:04-22-1991 TIME:[illegible]
ALBANY AND E. BROOKLINE ST NO-BUILD PM PEAK HOUR

STEP 2 LEFT TURNS FROM	B:ALBANY STREET	A:ALBANY SB
CONFLICTING FLOWS	332	484
CRITICAL GAPS	4.5	4.5
CAPACITY	968	835
CAPACITY USED	0%	5%
IMPEDANCE FACTOR	1.00	0.97
ACTUAL CAPACITY	968	835

STEP 3 THRU MOVES FROM	C:EAST BROOKLINE	D:SITE DRIVE
CONFLICTING FLOWS	853	842
CRITICAL GAPS	5.5	5.5
CAPACITY	400	406
CAPACITY USED	1%	0%
IMPEDANCE FACTOR	0.99	1.00
ACTUAL CAPACITY	390	396

STEP 4 LEFT TURNS FROM	C:EAST BROOKLINE	D:SITE DRIVE
CONFLICTING FLOWS	979	953
CRITICAL GAPS	6.0	6.0
CAPACITY	282	293
ACTUAL CAPACITY	239	259

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	41	835	794	A	4.53	0.05
LT FROM C:	64	239	175	D	20.56	0.36
SHARED TH/RT FROM C:	122	811	689	A	5.22	0.18
LT FROM D:	93	259	166	D	21.63	0.56
RT FROM D:	139	735	596	A	6.04	0.23

```
CINCH PROGRAM VERSION DATE 4-29-1989
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:04-22-1991              TIME:06:15:24
ALBANY AND E. BROOKLINE ST -BUILD PM PEAK HOUR


LAST DATASETS LOADED OR SAVED
VOLUME=ALBRBPM    GEOMETRICS=ALBRBPM
KEY:   D
       !
     A- -B
       !
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM D: STOP
          FROM D RT LANE: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: EAST BROOKLINE
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: SITE DRIVE
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY ST N C: EAST BROOKL D: SITE DRIVE
LEFTS             0.00           0.00           0.00           0.00
THRUS             0.00           0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY ST N C: EAST BROOKL D: SITE DRIVE
                LT   TH   RT   LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME          45  385    0    0  515   55   55    5  100   95    0   85
PHF              0.95           0.95           0.95           0.95
ADJ VOLUME      47  405    0    0  542   58   58    5  105  100    0   89
PERCENT GRADE    0.00           0.00           0.00
PASS CAR/HR     52             0             64    6  116  110    0   98


STEP 1 RIGHT TURNS FROM     C:EAST BROOKLINE        D:SITE DRIVE
CONFLICTING FLOWS                    405                  571
CRITICAL GAPS                        5.0                  5.0
CAPACITY                             792                  660
CAPACITY USED                        15%                  15%
IMPEDANCE FACTOR                    0.70                 0.70
ACTUAL CAPACITY                      792                  660
```

LPES HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES PAGE 1 OF 1
DATE:04-22-1991 TIME:08:15:24
ALBANY AND E. BROOKLINE ST [redacted]-BUILD PM PEAK HOUR

STEP 2 LEFT TURNS FROM	B:ALBANY ST NE	A:ALBANY SE
CONFLICTING FLOWS	405	600
CRITICAL GAPS	4.5	4.5
CAPACITY	902	743
CAPACITY USED	0%	7%
IMPEDANCE FACTOR	1.00	0.96
ACTUAL CAPACITY	902	743

STEP 3 THRU MOVES FROM	C:EAST BROOKLINE	D:SITE DRIVE
CONFLICTING FLOWS	1053	1024
CRITICAL GAPS	5.5	5.5
CAPACITY	306	318
CAPACITY USED	2%	0%
IMPEDANCE FACTOR	0.99	1.00
ACTUAL CAPACITY	293	305

STEP 4 LEFT TURNS FROM	C:EAST BROOKLINE	D:SITE DRIVE
CONFLICTING FLOWS	1142	1134
CRITICAL GAPS	6.0	6.0
CAPACITY	221	223
ACTUAL CAPACITY	191	192

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	52	743	691	A	5.21	0.09
LT FROM C:	64	191	127	D	28.26	0.50
SHARED TH/RT FROM C:	122	733	611	A	5.89	0.20
LT FROM D:	110	192	82	E	43.75	1.34
RT FROM D:	98	660	562	A	6.41	0.18

```
CINCH PROGRAM VERSION DATE 4-29-1986
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY/E.BROOKLINE.SITE DRIVE
BUILD MITIGATED PM PEAK HOUR
date:04-22-1991              time:08:22:27
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALBRBMPM   GEOMETRICS=ALBRBMPM   SIGNAL=ALBRBMPM
LOCATED IN CBD:N
VOLUME & GEOMETRICS
        VOLUMES        # OF LANES      LANE WIDTH      CROSS
DIR  LT   TH   RT     LT TH RT       LT   TH   RT     WALK
EB   55   50  100      1  1  0     12.0 12.0  0.0      0
WB   95    0   85      1  0  1     12.0  0.0 12.0      0
NB    0  395   55      0  1  0      0.0 12.0  0.0      0
SB   45  340    0      0  1  0      0.0 12.0  0.0      0

TRAFFIC & ROADWAY CONDITIONS
                    ADJ PARK                PEDESTRIANS        ARR
DIR GRADE %HV   Y/N MOVES BUSES  PHF CROSS BUT MIN TIME TYPE
EB  0.0%  0.0%   N     0     0   .950    0          7.0    3
WB  0.0%  0.0%   N     0     0   .950    0          7.0    3
NB  0.0%  0.0%   N     0     0   .950    0          7.0    3
SB  0.0%  0.0%         0     0   .950    0          7.0    3

PHASINGS
    EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  Y+R PRE/ACT
    l  t  r  p  l  t  r  p  l  t  r  p  l  t  r  p
 1  *  *  *     *  *  *                                19.3   3    A
 2                                  *  *     *  *       47.7   0    A

CYCLE=  70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTFR THFR RTFR
EB    55   50  100  .950    58   53  105
WB    95    0   85  .950   100    0   89
NB     0  395   55  .950     0  416   55
SB    45  340    0  .950    47  358    0

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Plt  Prt
EB  LT          58 1 1.00   58 1.00 0.00
EB  TH-RT      158 1 1.00  158 0.00 0.67
WB  LT         100 1 1.00  100 1.00 0.00
WB  RT          89 1 1.00   89 0.00 1.00
NB  TH-RT      474 1 1.00  474 0.00 0.12
SB  LT-TH      405 1 1.00  405 0.12 0.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)
LEFT TURN                OPPOSING APPROACH
BEING OPPOSED       VOLUMES      % OPPOSING LEFT TURN    # LANES     OPPOSING
                  LT   TH   RT       LT   TH   RT       LT  TH  RT    VOLUME
EASTBOUND        100    0   89      100  100    0        1   0   1       0
WESTBOUND         58   53  105      100  100  100        1   1   0     158
SOUTHBOUND         0  416   55      100  100  100        0   1   0     474

SATURATION FLOW ADJUSTMENT WORKSHEET
DIR LN GROUP  IDEAL N  Fwid   Fhv   For Fpark  Fpus Farea   Frt   Flt    s
EB  LT        1800  1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 0.950 1710
EB  TH-RT     1800  1 1.000 1.000 1.000 1.000 1.000 1.000 0.900 1.000 1620
WB  LT        1800  1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 0.727 1302
WB  RT        [illegible]
```

WB	TH-RT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SB	LT-TH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	Y	ta	Vo	V1t	Fit	Vc	Vo	Fto
WB	70	19	1	100	89	100	1.00	1	159	0.00
SB	70	49	1	405	358	47	0.12	1	474	0.00

CALCULATIONS

DIR	Ebo	Fo	Bo	Fe	F1	Bo	Pt	Bf	B1	Fa	Flt
WB	1800	0.088	14.478	0.776	1.000	4.870	0.000	0.000	1.449	0.722	0.722
SB	1800	0.283	39.670	0.579	0.117	7.951	0.882	5.906	1.942	0.921	0.921

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	o/C	c	v/c	CRITICAL
EB	LT	58	1710	0.03	0.28	473	0.12	
EB	TH-RT	158	1620	0.10	0.28	446	0.35	*
WB	LT	100	1302	0.08	0.28	360	0.28	
WB	RT	89	1530	0.06	0.28	423	0.21	
NB	TH-RT	474	1590	0.30	0.68	1083	0.44	*
SB	LT-TH	405	1657	0.24	0.68	1128	0.36	

CYCLE= 70.0 LOST= 3.0 SUM V/S CRIT= 0.40 TOTAL V/C= 0.41

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	o/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.12	0.28	70.0	14.42	473	0.01	0.85	12.26	B	0.6	1
EB	TH-RT	0.35	0.28	70.0	15.43	446	0.21	0.85	13.29	B	2.2	2
WB	LT	0.28	0.28	70.0	15.09	360	0.11	0.85	12.92	B	1.4	2
WB	RT	0.21	0.28	70.0	14.79	423	0.04	0.85	12.61	B	1.3	2
NB	TH-RT	0.44	0.68	70.0	3.55	1083	0.13	0.85	3.44	A	2.5	3
SB	LT-TH	0.36	0.68	70.0	3.53	1128	0.09	0.85	3.13	A	2.5	3

DIR	Delay	LOS
EB	13.02	B
WB	12.77	B
NB	3.44	A
SB	3.13	A

INTERSECTION DELAY = 6.33 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 70 TO 70 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 70.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 5.1 SECONDS
for chosen cycle length 70.0
suggested timing phase 1 is 16.5 secs green. 3.0 secs yellow + red clear
suggested timing phase 2 is 50.5 secs green. 0.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:04-19-1991 TIME:11:02:53
ALBANY/NEWTON EXISTING AM

LAST DATASETS LOADED OR SAVED
VOLUME=ALNEEXAM GEOMETRICS=ALNEEXAM

```
KEY:   D
       !
     A- -B
       !
       C
```

GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250.000: YES
CONTROLS: FROM C: STOP
FROM D: STOP
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: NEWTON EB
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: NEWTON WB
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: ALBANY SB	B: ALBANY NB	C: NEWTON EB	D: NEWTON WB
LEFTS	0.00	0.00	0.00	0.00
THRUS	0.00	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00	0.00

APPROACH	A: ALBANY SB			B: ALBANY NB			C: NEWTON EB			D: NEWTON WB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	84	218	131	152	663	125	0	0	0	10	0	5
PHF	0.95			0.95			0.95			0.95		
ADJ VOLUME	88	229	138	160	698	132	0	0	0	11	0	5
PERCENT GRADE	0.00			0.00			0.00					
PASS CAR/HR	97			176			0	0	0	12	0	6

STEP 1 RIGHT TURNS FROM	C:NEWTON EB	D:NEWTON WB
CONFLICTING FLOWS	I 1.701412E+38	764
CRITICAL GAPS	5.0	5.0
CAPACITY	0	529
CAPACITY USED	0%	1%
IMPEDANCE FACTOR	1.00	1.00
ACTUAL CAPACITY	0	525

1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 2 OF 2)
DATE:04-19-1991 TIME:11:02:53
ALBANY/NEWTON EXISTING AM

STEP 2 LEFT TURNS FROM	B:ALBANY NB	A:ALBANY SB
CONFLICTING FLOWS	367	825
CRITICAL GAPS	4.5	4.5
CAPACITY	936	584
CAPACITY USED	19%	17%
IMPEDANCE FACTOR	0.87	0.89
ACTUAL CAPACITY	936	584

STEP 3 THRU MOVES FROM	C:NEWTON EB	D:NEWTON WB
CONFLICTING FLOWS	1378	1379
CRITICAL GAPS	5.5	5.5
CAPACITY	192	191
CAPACITY USED	0%	0%
IMPEDANCE FACTOR	1.00	1.00
ACTUAL CAPACITY	148	147

STEP 4 LEFT TURNS FROM	C:NEWTON EB	D:NEWTON WB
CONFLICTING FLOWS	1362	1379
CRITICAL GAPS	6.0	6.0
CAPACITY	151	152
ACTUAL CAPACITY	116	117

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	97	584	486	A	7.40	0.20
LT FROM B:	176	936	760	A	4.74	0.23
ALL MOVES FROM D:	17	158	141	D	25.58	0.12

```
CINCH PROGRAM VERSION DATE 4-29-1983
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PHSE 1 OF 2)
DATE:04-19-1991            TIME:13:37:41
ALBANY/NEWTON NO-BUILD AM


LAST DATASETS LOADED OR SAVED
VOLUME=ALNENBAM   GEOMETRICS=ALNENBAM
KEY:   D
       :
     A- -B
       :
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM D: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: NEWTON EB
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: NEWTON WB
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: NEWTON EB   D: NEWTON WB
LEFTS             0.00           0.00           0.00           0.00
THRUS             0.00           0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: NEWTON EB   D: NEWTON WB
                 LT   TH   RT   LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME          125  280  135  150  680  85    0    0    0   10    0    5
PHF               0.95           0.95           0.95           0.95
ADJ VOLUME      132  295  142  158  716  89    0    0    0   11    0    5
PERCENT GRADE     0.00           0.00           0.00
PASS CAR/HR     145            174              0    0    0   12    0    6


STEP 1 RIGHT TURNS FROM     C:NEWTON EB          D:NEWTON WB
CONFLICTING FLOWS                 366                 761
CRITICAL GAPS                     5.0                 5.0
CAPACITY                          626                 531
CAPACITY USED                      0%                  1%
IMPEDANCE FACTOR                 1.00                1.00
ACTUAL CAPACITY                   626                 531
```

1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 2 OF 2)
DATE:04-19-1991 TIME:13:37:41
ALBANY/NEWTON NO-BUILD AM

STEP 2 LEFT TURNS FROM	B:ALBANY NB	A:ALBANY SB
CONFLICTING FLOWS	437	805
CRITICAL GAPS	4.5	4.5
CAPACITY	875	599
CAPACITY USED	20%	24%
IMPEDANCE FACTOR	0.86	0.82
ACTUAL CAPACITY	875	599

STEP 3 THRU MOVES FROM	C:NEWTON EB	D:NEWTON WB
CONFLICTING FLOWS	1461	1427
CRITICAL GAPS	5.5	5.5
CAPACITY	168	162
CAPACITY USED	0%	0%
IMPEDANCE FACTOR	1.00	1.00
ACTUAL CAPACITY	119	115

STEP 4 LEFT TURNS FROM	C:NEWTON EB	D:NEWTON WB
CONFLICTING FLOWS	1466	1457
CRITICAL GAPS	6.0	6.0
CAPACITY	132	127
ACTUAL CAPACITY	93	90

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	145	599	454	A	7.92	0.32
LT FROM B:	174	875	701	A	5.13	0.25
ALL MOVES FROM D:	17	125	107	D	33.55	0.16

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)
DATE:04-19-1991 TIME:13:43:11
ALBANY AND E.NEWTON BUILD AM

LAST DATASETS LOADED OR SAVED
VOLUME=ALNEBAM GEOMETRICS=ALNEBAM
KEY: A- -B
!
C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: STOP
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: C: E.NEWTON ST
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: ALBANY SB	B: ALBANY NB	C: E.NEWTON ST
LEFTS	0.00	0.00	0.00
THRUS	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00

APPROACH	A: ALBANY SB			B: ALBANY NB			C: E.NEWTON ST		
	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	435	135	150	855	0	0	0	0
PHF	0.95			0.95			0.95		
ADJ VOLUME	0	458	142	158	900	0	0	0	0
PERCENT GRADE	0.00			0.00			0.00		
PASS CAR/HR	0			174			0	0	0

STEP 1 RIGHT TURNS FROM	C:E.NEWTON ST
CONFLICTING FLOWS	529
CRITICAL GAPS	5.0
CAPACITY	692
ACTUAL CAPACITY	692

STEP 2 LEFT TURNS FROM	B:ALBANY NB
CONFLICTING FLOWS	600
CRITICAL GAPS	4.5
CAPACITY	743
CAPACITY USED	23%
IMPEDANCE FACTOR	0.53
ACTUAL CAPACITY	743

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 2 APPROACHES PAGE 2 of 2)
DATE:04-19-1991 TIME:12:40:11
ALBANY AND E.NEWTON BUILD AM

STEP 3 LEFT TURNS FROM C:E.NEWTON ST

CONFLICTING FLOWS	1587
CRITICAL GAPS	6.0
CAPACITY	107
ACTUAL CAPACITY	89

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	174	743	569	A	6.22	0.31

LAST DATASETS LOADED OR SAVED
VOLUME=ALNEEXPM GEOMETRICS=ALNEEXPM

```
KEY:   D
       :
     A- -B
       :
       C
```

GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
FROM D: STOP
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: NEWTON EB
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: SITE DRIVE
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: ALBANY SB	B: ALBANY NB	C: NEWTON EB	D: SITE DRIVE
LEFTS	0.00	0.00	0.00	0.00
THRUS	0.00	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00	0.00

APPROACH	A: ALBANY SB			B: ALBANY NB			C: NEWTON EB			D: SITE DRIVE		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	12	206	122	177	323	19	0	0	0	76	0	51
PHF	0.95			0.95			0.95			0.95		
ADJ VOLUME	13	217	128	186	340	20	0	0	0	80	0	54
PERCENT GRADE	0.00			0.00			0.00					
PASE CAR/HR	14			205			0	0	0	88	0	59

STEP 1 RIGHT TURNS FROM	C:NEWTON EB	D:SITE DRIVE
CONFLICTING FLOWS	281	350
CRITICAL GAPS	5.0	5.0
CAPACITY	904	840
CAPACITY USED	0%	7%
IMPEDANCE FACTOR	1.00	0.96
ACTUAL CAPACITY:	904	840

1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES PAGE 2 OF 2
DATE:04-22-1991 TIME:08:24:15
ALBANY/ E.NEWTON EXISTING PM

STEP 2 LEFT TURNS FROM	B:ALBANY NB	A:ALBANY SB
CONFLICTING FLOWS	345	360
CRITICAL GAPS	4.5	4.5
CAPACITY	956	942
CAPACITY USED	21%	1%
IMPEDANCE FACTOR	0.85	0.99
ACTUAL CAPACITY	956	942

STEP 3 THRU MOVES FROM	C:NEWTON EB	D:SITE DRIVE
CONFLICTING FLOWS	640	894
CRITICAL GAPS	5.5	5.5
CAPACITY	407	379
CAPACITY USED	0%	0%
IMPEDANCE FACTOR	1.00	1.00
ACTUAL CAPACITY	343	319

STEP 4 LEFT TURNS FROM	C:NEWTON EB	D:SITE DRIVE
CONFLICTING FLOWS	894	894
CRITICAL GAPS	6.0	6.0
CAPACITY	319	319
ACTUAL CAPACITY	256	257

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	14	942	928	A	3.58	0.01
LT FROM B:	205	956	751	A	4.79	0.27
ALL MOVES FROM D:	147	370	223	C	16.17	0.66

DIRCH PROGRAM VERSION DATE 4-23-1988
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:04-22-1991 TIME:05:39:04
ALBANY/ E.NEWTON NO-BUILD PM

LAST DATASETS LOADED OR SAVED
VOLUME=ALNENBPM GEOMETRICS=ALNENBPM
KEY: D
:
A- -B
:
C

GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
FROM D: STOP
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: NEWTON EB
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: SITE DRIVE
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: ALBANY SB	B: ALBANY NB	C: NEWTON EB	D: SITE DRIVE
LEFTS	0.00	0.00	0.00	0.00
THRUS	0.00	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00	0.00

APPROACH	A: ALBANY SB			B: ALBANY NB			C: NEWTON EB			D: SITE DRIVE		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	20	355	120	175	385	10	0	0	0	50	0	75
PHF	0.95			0.95			0.95			0.95		
ADJ VOLUME	21	374	126	184	405	11	0	0	0	53	0	79
PERCENT GRADE	0.00			0.00			0.00					
PASS CAR/HR	23			203			0	0	0	56	0	87

STEP 1 RIGHT TURNS FROM	C:NEWTON EB	D:SITE DRIVE
CONFLICTING FLOWS	437	411
CRITICAL GAP3	5.0	5.0
CAPACITY	766	786
CAPACITY USED	0%	11%
IMPEDANCE FACTOR	1.00	0.93
ACTUAL CAPACITY	766	786

1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:04-22-1991 TIME:08:29:14
ALBANY: E.NEWTON NO-BUILD PM

STEP 2 LEFT TURNS FROM	B:ALBANY NB	A:ALBANY SB
CONFLICTING FLOWS	500	416
CRITICAL GAPS	4.5	4.5
CAPACITY	822	893
CAPACITY USED	25%	2%
IMPEDANCE FACTOR	0.82	0.99
ACTUAL CAPACITY	822	893

STEP 3 THRU MOVES FROM	C:NEWTON EB	D:SITE DRIVE
CONFLICTING FLOWS	1058	1116
CRITICAL GAPS	5.5	5.5
CAPACITY	303	280
CAPACITY USED	0%	0%
IMPEDANCE FACTOR	1.00	1.00
ACTUAL CAPACITY	246	225

STEP 4 LEFT TURNS FROM	C:NEWTON EB	D:SITE DRIVE
CONFLICTING FLOWS	1137	1116
CRITICAL GAPS	6.0	6.0
CAPACITY	223	230
ACTUAL CAPACITY	168	165

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	23	893	870	A	4.14	0.03
LT FROM B:	203	822	619	A	5.81	0.33
ALL MOVES FROM D:	145	343	199	D	16.13	0.73

```
CINCH PROGRAM VERSION DATE 4-27-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 OF 2
DATE:04-22-1991            TIME:03:42:42
ALBANY AND E.NEWTON BUILD PM


LAST DATASETS LOADED OR SAVED
VOLUME=ALNEBPM    GEOMETRICS=ALNEBPM
KEY: A- -E
       :
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM C RT LANE: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: C: E.NEWTON ST
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO


SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: E.NEWTON ST
LEFTS             0.00           0.00           0.00
THRUS             0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: E.NEWTON ST
                LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME           0  460  120  175  570    0    0    0    0
PHF              0.95           0.95           0.95
ADJ VOLUME       0  484  126  184  600    0    0    0    0
PERCENT GRADE    0.00           0.00           0.00
PASS CAR/HR      0            203              0    0    0


STEP 1 RIGHT TURNS FROM     C:E.NEWTON ST
CONFLICTING FLOWS                    547
CRITICAL GAPS                        5.0
CAPACITY                             676
ACTUAL CAPACITY                      676


STEP 2 LEFT TURNS FROM     B:ALBANY NB
CONFLICTING FLOWS                    611
CRITICAL GAPS                        4.5
CAPACITY                             735
CAPACITY USED                         28%
IMPEDANCE FACTOR                     0.75
ACTUAL CAPACITY                       735
```

STEP 3 LEFT TURNS FROM C:E.NEWTON ST

CONFLICTING FLOWS	1332
CRITICAL GAPS	6.0
CAPACITY	164
ACTUAL CAPACITY	130

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	203	735	533	A	6.76	0.36

```
CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 OF 2)
DATE:04-19-1991            TIME:11:06:15
ALBANY AND E.CONCORD EXISTING AM


LAST DATASETS LOADED OR SAVED
VOLUME=ALCOEXAM   GEOMETRICS=ALCOEXAM
KEY: A- -B
       !
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM C RT LANE: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: C: E.CONCORD ST
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO


SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: E.CONCORD S
LEFTS             0.00           0.00           0.00
THRUS             0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: E.CONCORD S
                 LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME            0  228    0    0  885    0   55    0   60
PHF              0.95           0.95           0.95
ADJ VOLUME        0  240    0    0  932    0   58    0   63
PERCENT GRADE    0.00           0.00           0.00
PASS CAR/HR       0              0            64    0   69


STEP 1 RIGHT TURNS FROM     C:E.CONCORD ST
CONFLICTING FLOWS                     240
CRITICAL GAPS                         5.0
CAPACITY                              943
ACTUAL CAPACITY                       943


STEP 2 LEFT TURNS FROM     B:ALBANY NB
CONFLICTING FLOWS                     240
CRITICAL GAPS                         4.5
CAPACITY                             1055
CAPACITY USED                          0%
IMPEDANCE FACTOR                     1.00
ACTUAL CAPACITY                      1055
```

DATE:04-17-1991 TIME:11:05:15
ALBANY AND E.CONCORD EXISTING AM

STEP 3 LEFT TURNS FROM C:E.CONCORD ST

CONFLICTING FLOWS	1172
CRITICAL GAPS	6.0
CAPACITY	211
ACTUAL CAPACITY	211

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM C:	64	211	147	D	24.44	0.00
RT FROM C:	69	943	874	A	4.12	0.07

```
CINCH PROGRAM VERSION DATE 4-25-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 2 APPROACHES (PAGE 1 of 2)
DATE:04-19-1991              TIME:13:54:05
ALBANY/CONCORD NO-BUILD AM


LAST DATASETS LOADED OR SAVED
VOLUME=ALCONBAM   GEOMETRICS=ALCONBAM
KEY: A- -B
       :
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM C RT LANE: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: C: CONCORD EB
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO


SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: CONCORD EB
LEFTS             0.00           0.00           0.00
THRUS             0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: CONCORD EB
                 LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME            0  290    0    0  860    0   55    0   60
PHF              0.95           0.95           0.95
ADJ VOLUME        0  305    0    0  905    0   58    0   63
PERCENT GRADE    0.00           0.00           0.00
PASS CAR/HR       0              0             64    0   69


STEP 1 RIGHT TURNS FROM     C:CONCORD EB
CONFLICTING FLOWS                     305
CRITICAL GAPS                         5.0
CAPACITY                              881
ACTUAL CAPACITY                       881


STEP 2 LEFT TURNS FROM     B:ALBANY NB
CONFLICTING FLOWS                     305
CRITICAL GAPS                         4.5
CAPACITY                              993
CAPACITY USED                          0%
IMPEDANCE FACTOR                     1.00
ACTUAL CAPACITY                       993
```

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 2 of 2)
DATE:04-19-1991 TIME:13:54:05
ALBANY/CONCORD NO-BUILD AM

STEP 3 LEFT TURNS FROM C:CONCORD EB

CONFLICTING FLOWS	1211
CRITICAL GAPS	6.0
CAPACITY	199
ACTUAL CAPACITY	199

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM C:	64	199	135	D	26.66	0.00
RT FROM C:	69	881	812	A	4.44	0.08

```
CINCH PROGRAM VERSION DATE 4-29-1985
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:04-19-1991            TIME:13:58:29
ALBANY AND E. CONCORD BUILD AM PEAK HOUR


LAST DATASETS LOADED OR SAVED
VOLUME=ALCOPAM    GEOMETRICS=ALCOPAM
KEY:   D
       !
     A- -B
       !
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM D: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: E. CONCORD
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: SITE DRIVE
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: E. CONCORD  D: SITE DRIVE
LEFTS             0.00           0.00           0.00           0.00
THRUS             0.00           0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: E. CONCORD  D: SITE DRIVE
                 LT   TH   RT   LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME            0  235    0    0  940  300   55   15   60   25    0    0
PHF               0.95           0.95           0.95           0.95
ADJ VOLUME        0  247    0    0  989  316   58   16   63   26    0    0
PERCENT GRADE     0.00           0.00           0.00
PASS CAR/HR       0              0              64   17   69   29    0    0


STEP 1 RIGHT TURNS FROM     C:E. CONCORD            D:SITE DRIVE
CONFLICTING FLOWS                 247                    1147
CRITICAL GAPS                     5.0                     5.0
CAPACITY                          936                     329
CAPACITY USED                       7%                      0%
IMPEDANCE FACTOR                 0.96                    1.00
ACTUAL CAPACITY                   936                     329
```

DATE:04-19-1991 TIME:13:55:29
ALBANY AND E. CONCORD BUILD AM PEAK HOUR

STEP 2 LEFT TURNS FROM	B:ALBANY NB	A:ALBANY SB
CONFLICTING FLOWS	247	1305
CRITICAL GAPS	4.5	4.5
CAPACITY	1048	336
CAPACITY USED	0%	0%
IMPEDANCE FACTOR	1.00	1.00
ACTUAL CAPACITY	1048	336

STEP 3 THRU MOVES FROM	C:E. CONCORD	D:SITE DRIVE
CONFLICTING FLOWS	1553	1395
CRITICAL GAPS	5.5	5.5
CAPACITY	146	186
CAPACITY USED	12%	0%
IMPEDANCE FACTOR	0.92	1.00
ACTUAL CAPACITY	146	186

STEP 4 LEFT TURNS FROM	C:E. CONCORD	D:SITE DRIVE
CONFLICTING FLOWS	1553	1474
CRITICAL GAPS	6.0	6.0
CAPACITY	114	130
ACTUAL CAPACITY	114	115

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM C:	64	114	50	E	71.92	1.27
SHARED TH/RT FROM C:	67	449	362	B	9.93	0.24
ALL MOVES FROM D:	29	115	86	E	41.80	0.34

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY AND EAST CONCORD/SITE DRIVE
BUILD MITIGATED AM PEAK HOUR
date:04-19-1991 time:14:04:06
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALCOBMAM GEOMETRICS=ALCOBMAM SIGNAL=ALCOBMAM
LOCATED IN CBD:N

VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	80	0	60	1	0	1	12.0	0.0	12.0	0
WB	80	0	155	1	0	1	12.0	0.0	12.0	0
NB	0	835	0	0	1	0	0.0	12.0	0.0	0
SB	0	215	0	0	1	0	0.0	12.0	0.0	0

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS		ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS BUT	MIN TIME	TYPE
EB	0.0%	0.0%	N	0	0	.950	0	7.0	3
WB	0.0%	0.0%	N	0	0	.950	0	7.0	3
NB	0.0%	0.0%	N	0	0	.950	0	7.0	3
SB	0.0%	0.0%	N	0	.0	.950	0	7.0	3

PHASING

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PREVACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1	*	*	*														5.2	3	A
2													*	*		*	56.8	3	A

CYCLE= 70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	80	0	60	.950	84	0	63
WB	80	0	155	.950	84	0	163
NB	0	835	0	.950	0	879	0
SB	0	215	0	.950	0	226	0

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	84	1	1.00	84	1.00	0.00
EB	RT	63	1	1.00	63	0.00	1.00
WB	LT	84	1	1.00	84	1.00	0.00
WB	RT	163	1	1.00	163	0.00	1.00
NB	TH	879	1	1.00	879	0.00	0.00
SB	TH	226	1	1.00	226	0.00	0.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	84	0	163	0	0	0	1	0	1	0
WESTBOUND	64	0	63	0	0	0	1	0	1	0

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT	1600	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.950	1710
EB	RT	1600	1	1.000	1.000	1.000	1.000	1.000	1.000	0.850	1.000	1530
WB	LT	1600	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.950	1710
WB	RT	1600	1	1.000	1.000	1.000	1.000	1.000	1.000	0.850	1.000	1530
NB	TH	1600	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1600

```
SB  TH        18[illegible]  1 1.[illegible] 1.000 1.000 1.00  1.000 1.000 1.[illegible] 1.[illegible] 18[illegible]

CAPACITY ANALYSIS WORKSHEET
DIR LN GROUP    v    s  v/s  c/C    c  v/c  CRITICAL
EB  LT         84 1710 0.05 0.07  127 0.66     *
EB  RT         63 1530 0.04 0.07  114 0.55
WB  LT         84 1710 0.05 0.00    0 0.00
WB  RT        163 1530 0.11 0.00    0 0.00
NB  TH        879 1800 0.49 0.84 1512 0.58     *
SB  TH        226 1800 0.13 0.84 1512 0.15

CYCLE= 70.0  LOST= 6.0  SUM V/S CRIT= 0.54 TOTAL V/C= 0.59

LEVEL OF SERVICE WORKSHEET
DIR LN GROUP  v/c  g/C   C     d1    c      d2   PF   Delay LOS Avg Q  95% Q
EB  LT       0.65 0.07  70.0  23.97  127    8.04 1.00   32.00  D   1.5    3
EB  RT       0.55 0.07  70.0  23.77  114    4.27 0.85   23.83  C   1.1    2
WB  LT       0.00 0.00  70.0   0.00    0    0.00 0.85    0.00  A   1.6    2
WB  RT       0.00 0.00  70.0   0.00    0    0.00 0.85    0.00  A   3.2    3
NB  Th       0.58 0.84  70.0   1.33 1512    0.43 0.85    1.50  A   2.7    3
SB  TH       0.15 0.84  70.0   0.78 1512    0.00 0.85    0.67  A   0.7    1

DIR Delay LOS
EB  28.50  D
WB   0.00  A
NB   1.50  A
SB   0.67  A
INTERSECTION DELAY =  3.78 INTERSECTION LOS=A

THE CYCLE LENGTH WITHIN THE BOUNDS OF  70  TO  70 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS  70.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE  13.8 SECONDS
for chosen cycle length  70.0
suggested timing phase 1 is   5.9 secs green.   3.0 secs yellow + red clear
suggested timing phase 2 is  58.1 secs green.   3.0 secs yellow + red clear
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CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 2 APPROACHES (PHASE 1 OF 2)
DATE:04-22-1991            TIME:08:51:40
ALBANY AND E.CONCORD EXISTING PM


LAST DATASETS LOADED OR SAVED
VOLUME=ALCOEXPM   GEOMETRICS=ALCOEXPM
KEY: A- -B
       :
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM C RT LANE: STOP
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: C: E.CONCORD ST
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO


SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: ALBANY SB   B: ALBANY NB   C: E.CONCORD S
LEFTS             0.00           0.00           0.00
THRUS             0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00


APPROACH        A: ALBANY SB   B: ALBANY NB   C: E.CONCORD S
                LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME           0  336    0    0  456    0   63    0   81
PHF              0.95           0.95           0.95
ADJ VOLUME       0  354    0    0  480    0   66    0   86
PERCENT GRADE    0.00           0.00           0.00
PASS CAR/HR      0              0             73    0   95


STEP 1 RIGHT TURNS FROM     C:E.CONCORD ST
CONFLICTING FLOWS                     354
CRITICAL GAPS                         5.0
CAPACITY                              837
ACTUAL CAPACITY                       837


STEP 2 LEFT TURNS FROM     B:ALBANY NB
CONFLICTING FLOWS                     354
CRITICAL GAPS                         4.5
CAPACITY                              948
CAPACITY USED                          0%
IMPEDANCE FACTOR                     1.00
ACTUAL CAPACITY                       948
```

DATE:04-22-1991 TIME:08:51:48
ALBANY AND E.CONCORD EXISTING PM

STEP 3 LEFT TURNS FROM C:E.CONCORD ST

CONFLICTING FLOWS	834
CRITICAL GAPS	6.0
CAPACITY	348
ACTUAL CAPACITY	348

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM C:	73	348	275	C	13.08	0.00
RT FROM C:	95	637	742	A	4.85	0.10

DINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 2 APPROACHES (PAGE 1 OF 2)
DATE:04-22-1991 TIME:08:54:43
ALBANY/CONCORD NO-BUILD PM

LAST DATASETS LOADED OR SAVED
VOLUME=ALCONBPM GEOMETRICS=ALCONBPM
KEY: A- -B
!
C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: STOP
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: N

MINOR STREET LANES
APPROACH: C: CONCORD EB
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: ALBANY SB	B: ALBANY NB	C: CONCORD EB
LEFTS	0.00	0.00	0.00
THRUS	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00

APPROACH	A: ALBANY SB			B: ALBANY NB			C: CONCORD EB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	405	0	0	505	0	65	0	80
PHF	0.95			0.95			0.95		
ADJ VOLUME	0	426	0	0	532	0	68	0	84
PERCENT GRADE	0.00			0.00			0.00		
PASS CAR/HR	0			0			75	0	93

STEP 1 RIGHT TURNS FROM C:CONCORD EB

CONFLICTING FLOWS	426
CRITICAL GAPS	5.0
CAPACITY	774
ACTUAL CAPACITY	774

STEP 2 LEFT TURNS FROM B:ALBANY NB

CONFLICTING FLOWS	426
CRITICAL GAPS	4.5
CAPACITY	884
CAPACITY USED	0%
IMPEDANCE FACTOR	1.00
ACTUAL CAPACITY	884

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 2 of 2)
DATE:04-22-1991 TIME:05:54:47
ALBANY/CONCORD NO-BUILD PM

STEP 3 LEFT TURNS FROM C:CONCORD EB

CONFLICTING FLOWS	958
CRITICAL GAPS	6.0
CAPACITY	291
ACTUAL CAPACITY	291

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM C:	75	291	216	C	16.70	0.00
RT FROM C:	93	774	682	A	5.28	0.11

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:04-22-1991 TIME:09:04:37
ALBANY AND E.CONCORD BUILD PM

LAST DATASETS LOADED OR SAVED
VOLUME=ALCOBPM GEOMETRICS=ALCOBPM
KEY: D
:
A- -B
:
C

GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
FROM D: STOP
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: NO
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: NO

MINOR STREET LANES

APPROACH: C: E. CONCORD
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: SITE DRIVE
EXCLUSIVE LEFT TURN LANES: NO
EXCLUSIVE RIGHT TURN LANES: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: NO
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: ALBANY SB	B: ALBANY NB	C: E. CONCORD	D: SITE DRIVE
LEFTS	0.00	0.00	0.00	0.00
THRUS	0.00	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00	0.00

APPROACH	A: ALBANY SB			B: ALBANY NB			C: E. CONCORD			D: SITE DRIVE		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	425	0	0	465	55	65	5	80	210	0	0
PHF	0.95			0.95			0.95			0.95		
ADJ VOLUME	0	447	0	0	489	58	68	5	84	221	0	0
PERCENT GRADE	0.00			0.00			0.00					
PASS CAR/HR	0			0			75	6	93	243	0	0

STEP 1 RIGHT TURNS FROM	C:E. CONCORD	D:SITE DRIVE
CONFLICTING FLOWS	447	518
CRITICAL GAPS	5.0	5.0
CAPACITY	757	700
CAPACITY USED	12%	0%
IMPEDANCE FACTOR	0.92	1.00
ACTUAL CAPACITY	757	700

D-TE:04-22-1991 TIME:09:04:07
ALBANY AND E.CONCORD BLLD PM

STEP 2 LEFT TURNS FROM	B:ALBANY NB	A:ALBANY SB
CONFLICTING FLOWS	447	547
CRITICAL GAPS	4.5	4.5
CAPACITY	866	784
CAPACITY USED	0%	0%
IMPEDANCE FACTOR	1.00	1.00
ACTUAL CAPACITY	866	784

STEP 3 THRU MOVES FROM	C:E. CONCORD	D:SITE DRIVE
CONFLICTING FLOWS	995	966
CRITICAL GAPS	5.5	5.5
CAPACITY	331	344
CAPACITY USED	2%	0%
IMPEDANCE FACTOR	0.99	1.00
ACTUAL CAPACITY	331	344

STEP 4 LEFT TURNS FROM	C:E. CONCORD	D:SITE DRIVE
CONFLICTING FLOWS	995	1055
CRITICAL GAPS	6.0	6.0
CAPACITY	276	252
ACTUAL CAPACITY	275	270

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM C:	75	275	200	C	17.98	0.38
SHARED TH/RT FROM C:	92	704	605	A	5.95	0.15
ALL MOVES FROM D:	243	230	-13	F	INFINITE	INFINITE

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CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY AND EAST CONCORD/SITE DRIVE
BUILD MITIGATED PM PEAK HOUR
date:04-22-1991              time:09:08:27
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALCOBMPM   GEOMETRICS=ALCOBMPM   SIGNAL=ALCOBMPM
LOCATED IN CBD:N
VOLUME & GEOMETRICS
        VOLUMES       # OF LANES      LANE WIDTH      CROSS
DIR  LT   TH   RT    LT TH RT       LT   TH   RT     WALK
EB   70    0   80     1  0  1     12.0  0.0 12.0      0
WB   35    0    0     1  0  1     12.0  0.0 12.0      0
NB    0  525    0     0  1  0      0.0 12.0  0.0      0
SB    0  390    0     0  1  0      0.0 12.0  0.0      0

TRAFFIC & ROADWAY CONDITIONS
                    ADJ PARK                PEDESTRIANS        ARR
DIR GRADE %HV   Y/N NOVES BUSES  PHF CROSS BUT MIN TIME TYPE
EB  0.0%  0.0%   N     0     0   .950    0          7.0    3
WB  0.0%  0.0%   N     0     0   .950    0          7.0    3
NB  0.0%  0.0%   N     0     0   .950    0          7.0    3
SB  0.0%  0.0%   N     0     0   .950    0          7.0    3

PHASINGS
    EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  Y+R PRE/ACT
    l  t  r  p  l  t  r  p  l  t  r  p  l  t  r  p
 1  *  *  *                                          11.4   3    A
 2                                *  *     *  *       52.6   3    A

CYCLE=  70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTFR THFR RTFR
EB    70    0   80  .950    74    0   84
WB    35    0    0  .950    37    0    0
NB     0  525    0  .950     0  553    0
SB     0  390    0  .950     0  411    0

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Flt  Frt
EB  LT          74 1 1.00   74 1.00 0.00
EB  RT          84 1 1.00   84 0.00 1.00
WB  LT          37 1 1.00   37 1.00 0.00
NB  TH         553 1 1.00  553 0.00 0.00
SB  TH         411 1 1.00  411 0.00 0.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)
LEFT TURN                OPPOSING APPROACH
BEING OPPOSED       VOLUMES       % OPPOSING LEFT TURN    # LANES     OPPOSING
                  LT   TH   RT        LT   TH   RT       LT  TH  RT    VOLUME
EASTBOUND         37    0    0         0    0    0        1   0   1       0
WESTBOUND         74    0   84         0    0    0        1   0   1       0

SATURATION FLOW ADJUSTMENT WORKSHEET
DIR LN GROUP  IDEAL N  Fwid   Fhv   For Fpark  Fbus Farea   Frt   Flt    s
EB  LT        1800  1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 0.950 1710
EB  RT        1800  1 1.000 1.000 1.000 1.000 1.000 1.000 0.850 1.000 1530
WB  LT        1800  1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 0.950 1710
NB  TH        1800  1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1800
SB  TH        1800  1 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1800
```

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	d/C	c	v/c	CRITICAL
EB	LT	74	1710	0.04	[illegible]	278	0.26	
EB	RT	84	1500	[illegible]	[illegible]	249	0.34	*
WB	LT	27	1710	[illegible]	0.00	0	0.00	
NB	TH	552	1800	0.31	0.75	1353	0.41	*
SB	TH	411	1800	0.23	0.75	1353	0.30	

CYCLE= 70.0 LOST= 6.0 SUM V/S CRIT= 0.36 TOTAL V/C= 0.40

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	d/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.26	0.16	70.0	19.49	278	0.13	1.00	19.62	C	1.2	2
EB	RT	0.34	0.16	70.0	19.74	249	0.32	0.85	17.05	C	1.4	2
WB	LT	0.00	0.00	70.0	0.00	0	0.00	0.85	0.00	A	0.7	1
NB	TH	0.41	0.75	70.0	2.37	1353	0.12	0.85	2.11	A	2.7	3
SB	TH	0.30	0.75	70.0	2.13	1353	0.04	0.85	1.84	A	2.0	2

DIR Delay LOS
EB 18.25 C
WB 0.00 A
NB 2.11 A
SB 1.84 A
INTERSECTION DELAY = 4.15 INTERSECTION LOS=A

THE CYCLE LENGTH WITHIN THE BOUNDS OF 70 TO 70 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 70.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 9.7 SECONDS
for chosen cycle length 70.0
suggested timing phase 1 is 9.7 secs green, 3.0 secs yellow + red clear
suggested timing phase 2 is 54.3 secs green, 3.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
HARRISON AVE/E.CONCORD ST
EXISTING CONDITIONS AM PEAK
date:01-29-1991 time:10:59:45
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=hacoexam GEOMETRICS=hacoexam SIGNAL=hacoexam
LOCATED IN CBD:Y
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	15	45	25	0	2	0	0.0	13.0	0.0	39
WB	0	0	0	0	0	0	0.0	0.0	0.0	33
NB	0	410	51	0	1	0	0.0	15.0	0.0	39
SB	40	265	0	0	2	0	0.0	10.0	0.0	39

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	0.0%	N	0	0	.950	0	Y	16.8	3
WB	0.0%	0.0%		0	0	.950	0	Y	16.8	0
NB	0.0%	0.0%		0	0	.950	0	Y	16.8	3
SB	0.0%	0.0%		0	0	.950	0	Y	16.8	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1										*	*			*	*		46.0	4	P
2	*	*	*														16.0	4	P

CYCLE= 70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	15	45	25	.950	16	47	26
WB	0	0	0	.950	153	1601	0
NB	0	410	51	.950	0	432	54
SB	40	265	0	.950	42	279	0

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT-TH-RT	89	2	1.05	94	0.18	0.29
WB	TH-RT	485	1	1.00	485	0.00	0.11
SB	LT-TH	321	2	1.05	337	0.13	0.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN BEING OPPOSED	OPPOSING APPROACH VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	153	1601	0	0	0	0	0	0	0	0
SOUTHBOUND	0	432	54	100	100	100	0	1	0	485

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT-TH-RT	1800	2	1.033	1.000	1.000	1.000	1.000	0.900	0.956	1.000	3200
WB	TH-RT	1800	1	1.100	1.000	1.000	1.000	1.000	0.900	0.885	1.000	1577
SB	LT-TH	1800	2	0.933	1.000	1.000	1.000	1.000	0.900	1.000	0.861	2602

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT
INPUT VARIABLES

DIR	C	G	N	Va	Vo	Vlt	Plt	No	Vp	Plto
SB	70	46	2	321	321	42	0.13	1	485	0.00

CALCULATIONS

DIR	Sop	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fm	Flt
SB	1800	0.270	37.142	0.572	0.366	8.858	0.634	3.009	1.968	0.721	0.861

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT-TH-RT	94	3200	0.03	0.23	731	0.13	*
NB	TH-RT	485	1577	0.31	0.66	1036	0.47	*
SB	LT-TH	337	2602	0.13	0.66	1710	0.20	

CYCLE= 70.0 LOST= 8.0 SUM V/S CRIT= 0.34 TOTAL V/C= 0.38

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT-TH-RT	0.13	0.23	70.0	16.31	731	0.00	1.00	16.31	C	1.3	2
NB	TH-RT	0.47	0.66	70.0	4.52	1036	0.26	1.00	4.77	A	3.2	3
SB	LT-TH	0.20	0.66	70.0	3.59	1710	0.01	1.00	3.60	A	2.1	2

DIR	Delay	LOS
EB	16.31	C
NB	4.77	A
SB	3.60	A

INTERSECTION DELAY = 5.52 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 70 TO 70 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 70.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 12.4 SECONDS
for chosen cycle length 70.0
suggested timing phase 1 is 56.6 secs green, 4.0 secs yellow + red clear
suggested timing phase 2 is 5.4 secs green, 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
HARRISON AVE/E.CONCORD ST
FUTURE 2000 NO-BUILD AM PEAK HOUR (EXISTING TIMINGS)
date:01-30-1991 time:09:29:20
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=HACONBAM GEOMETRICS=HACONBAM SIGNAL=HACONBAM
NB NB
LOCATED IN CBD:Y
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	15	45	25	0	2	0	0.0	13.0	0.0	39
WB	0	0	0	0	0	0	0.0	0.0	0.0	33
NB	0	570	50	0	1	0	0.0	15.0	0.0	39
SB	40	270	0	0	2	0	0.0	10.0	0.0	39

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	0.0%	N	0	0	.950	0	Y	16.8	3
WB	0.0%	0.0%		0	0	.950	0	Y	16.8	0
NB	0.0%	0.0%		0	0	.950	0	Y	16.8	3
SB	0.0%	0.0%		0	0	.950	0	Y	16.8	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1										*	*			*	*		46.0	4	P
2	*	*	*														16.0	4	P

CYCLE= 70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	15	45	25	.950	16	47	26
WB	0	0	0	.950	429	791	0
NB	0	570	50	.950	0	600	53
SB	40	270	0	.950	42	284	0

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT-TH-RT	89	2	1.05	94	0.18	0.29
WB	TH-RT	653	1	1.00	653	0.00	0.08
SB	LT-TH	326	2	1.05	343	0.13	0.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	429	791	0	0	0	0	0	0	0	0
SOUTHBOUND	0	600	53	100	100	100	0	1	0	653

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT-TH-RT	1800	2	1.033	1.000	1.000	1.000	1.000	0.900	0.956	1.000	3200
WB	TH-RT	1800	1	1.100	1.000	1.000	1.000	1.000	0.900	0.889	1.000	1584
SB	LT-TH	1800	2	0.933	1.000	1.000	1.000	1.000	0.900	1.000	0.778	2352

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT
INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Plt	No	Vo	Plto
SB	70	46	2	326	326	42	0.13	1	653	0.00

CALCULATIONS

DIR	Soo	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fa	Flt
SB	1800	0.363	32.349	0.467	0.432	13.651	0.568	2.577	2.408	0.556	0.778

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT-TH-RT	94	3200	0.03	0.23	731	0.13	*
NB	TH-RT	653	1584	0.41	0.66	1041	0.63	*
SB	LT-TH	343	2352	0.15	0.66	1546	0.22	

CYCLE= 70.0 LOST= 8.0 SUM V/S CRIT= 0.44 TOTAL V/C= 0.50

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT-TH-RT	0.13	0.23	70.0	16.31	731	0.00	1.00	16.31	C	1.3	2
NB	TH-RT	0.63	0.66	70.0	5.32	1041	0.86	1.00	6.18	B	4.4	4
SB	LT-TH	0.22	0.66	70.0	3.66	1546	0.01	1.00	3.67	A	2.2	2

DIR	Delay	LOS
EB	16.31	C
NB	6.18	B
SB	3.67	A

INTERSECTION DELAY = 6.26 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 70 TO 70 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 70.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 14.9 SECONDS
for chosen cycle length 70.0
suggested timing phase 1 is 57.9 secs green, 4.0 secs yellow + red clear
suggested timing phase 2 is 4.1 secs green, 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
HARRISON AVE/E.CONCORD ST
BUILD AM PEAK HOUR
date:03-07-1991 time:14:09:22
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=HACOB AM GEOMETRICS=HACOB AM SIGNAL=HACOB AM
LOCATED IN CBD:Y
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	15	45	25	0	2	0	0.0	13.0	0.0	39
WB	0	0	0	0	0	0	0.0	0.0	0.0	33
NB	0	570	65	0	1	0	0.0	15.0	0.0	39
SB	40	270	0	0	2	0	0.0	10.0	0.0	39

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	0.0%	N	0	0	.950	0	Y	16.8	3
WB	0.0%	0.0%		0	0	.950	0	Y	16.8	0
NB	0.0%	0.0%		0	0	.950	0	Y	16.8	3
SB	0.0%	0.0%		0	0	.950	0	Y	16.8	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1									‡	‡			‡	‡			46.0	4	P
2	‡	‡	‡														16.0	4	P

CYCLE= 70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	15	45	25	.950	16	47	26
WB	0	0	0	.950	358	363	21
NB	0	570	65	.950	0	600	68
SB	40	270	0	.950	42	284	0

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	P1t	Prt
EB	LT-TH-RT	89	2	1.05	94	0.18	0.29
NB	TH-RT	668	1	1.00	668	0.00	0.10
SB	LT-TH	326	2	1.05	343	0.13	0.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	358	363	21	0	0	0	0	0	0	0
SOUTHBOUND	0	600	68	100	100	100	0	1	0	668

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT-TH-RT	1800	2	1.033	1.000	1.000	1.000	1.000	0.900	0.956	1.000	3200
NB	TH-RT	1800	1	1.100	1.000	1.000	1.000	1.000	0.900	0.886	1.000	1579
SB	LT-TH	1800	2	0.933	1.000	1.000	1.000	1.000	0.900	1.000	0.769	2325

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT
INPUT VARIABLES

DIR	C	G	N	Va	Vo	VIt	P1t	No	Vo	P1to
SB	70	46	2	326	326	42	0.13	1	668	0.00

CALCULATIONS

DIR	Sop	Yo	Gu	Fs	Pl	Go	Pt	Gf	Ei	Fa	Flt
SB	1800	0.371	31.823	0.457	0.441	14.177	0.559	2.498	2.460	0.538	0.769

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT-TH-RT	94	3200	0.03	0.23	731	0.13	*
NB	TH-RT	668	1579	0.42	0.66	1038	0.64	*
SB	LT-TH	343	2325	0.15	0.66	1528	0.22	

CYCLE= 70.0 LOST= 8.0 SUM V/S CRIT= 0.45 TOTAL V/C= 0.51

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT-TH-RT	0.13	0.23	70.0	16.31	731	0.00	1.00	16.31	C	1.3	2
NB	TH-RT	0.64	0.66	70.0	5.42	1038	0.98	1.00	6.40	B	4.5	4
SB	LT-TH	0.22	0.66	70.0	3.67	1528	0.01	1.00	3.68	A	2.2	2

DIR	Delay	LOS
EB	16.31	C
NB	6.40	B
SB	3.68	A

INTERSECTION DELAY = 6.40 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 70 TO 70 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 70.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 15.3 SECONDS
for chosen cycle length 70.0
suggested timing phase 1 is 58.0 secs green. 4.0 secs yellow + red clear
suggested timing phase 2 is 4.0 secs green. 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
HARRISON AVE/E.CONCORD ST
EXISTING CONDITIONS PM PEAK
date:01-29-1991 time:11:01:19
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=hacoexom GEOMETRICS=hacoexom SIGNAL=hacoexom
LOCATED IN CBD:Y

VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	10	35	30	0	2	0	0.0	13.0	0.0	39
WB	0	0	0	0	0	0	0.0	0.0	0.0	33
NB	0	291	50	0	1	0	0.0	15.0	0.0	39
SB	60	365	0	0	2	0	0.0	10.0	0.0	39

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK			PEDESTRIANS				ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	0.0%	N	0	0	.950	0	Y	16.8	3
WB	0.0%	0.0%		0	0	.950	0	Y	16.8	0
NB	0.0%	0.0%		0	0	.950	0	Y	16.8	3
SB	0.0%	0.0%		0	0	.950	0	Y	16.8	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1										*	*			*	*		46.0	4	P
2	*	*	*														16.0	4	P

CYCLE= 70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	10	35	30	.950	11	37	32
WB	0	0	0	.950	0	0	0
NB	0	291	50	.950	0	306	53
SB	60	365	0	.950	63	384	0

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT-TH-RT	79	2	1.05	83	0.13	0.40
NB	TH-RT	359	1	1.00	359	0.00	0.15
SB	LT-TH	447	2	1.05	470	0.14	0.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	0	0	0	0	0	0	0	0	0	0
SOUTHBOUND	0	306	53	100	100	100	0	1	0	359

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT-TH-RT	1800	2	1.033	1.000	1.000	1.000	1.000	0.900	0.940	1.000	3147
NB	TH-RT	1800	1	1.100	1.000	1.000	1.000	1.000	0.900	0.880	1.000	1569
SB	LT-TH	1800	2	0.933	1.000	1.000	1.000	1.000	0.900	1.000	0.904	2734

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT
INPUT VARIABLES

DIR	C	G	N	Va	Vo	Vlt	Plt	No	Vo	Plto
SB	70	46	2	447	447	63	0.14	1	359	0.00

CALCULATIONS

DIR	Soo	Yo	Gu	Fs	PI	Go	Pt	Gf	EI	Fm	Flt
SB	1800	0.199	40.022	0.651	0.354	5.978	0.646	2.662	1.729	0.808	0.904

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT-TH-RT	83	3147	0.03	0.23	719	0.12	*
NB	TH-RT	359	1569	0.23	0.66	1031	0.35	*
SB	LT-TH	470	2734	0.17	0.66	1797	0.26	

CYCLE= 70.0 LOST= 8.0 SUM V/S CRIT= 0.26 TOTAL V/C= 0.29

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT-TH-RT	0.12	0.23	70.0	16.26	719	0.00	1.00	16.26	C	1.2	2
NB	TH-RT	0.35	0.66	70.0	4.05	1031	0.09	1.00	4.14	A	2.4	2
SB	LT-TH	0.26	0.66	70.0	3.78	1797	0.02	1.00	3.79	A	3.0	3

DIR	Delay	LOS
EB	16.26	C
NB	4.14	A
SB	3.79	A

INTERSECTION DELAY = 5.06 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 70 TO 70 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 70.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 10.9 SECONDS
for chosen cycle length 70.0
suggested timing phase 1 is 55.6 secs green, 4.0 secs yellow + red clear
suggested timing phase 2 is 6.4 secs green, 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
HARRISON AVE/E.CONCORD ST
FUTURE 2000 NO-BUILD PM PEAK HOUR (EXISTING TIMINGS)
date:01-30-1991 time:09:17:48
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=HACONBPM GEOMETRICS=HACO[illegible]PM SIGNAL=HACO[illegible]PM
NB NB
LOCATED IN CBD:Y
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	10	35	30	0	2	0	0.0	13.0	0.0	39
WB	0	0	0	0	0	0	0.0	0.0	0.0	33
NB	0	400	50	0	1	0	0.0	15.0	0.0	39
SB	60	455	0	0	2	0	0.0	10.0	0.0	39

TRAFFIC & ROADWAY CONDITIONS

			ADJ	PARK			PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	0.0%	N	0	0	.950	0	Y	16.8	3
WB	0.0%	0.0%		0	0	.950	0	Y	16.8	0
NB	0.0%	0.0%		0	0	.950	0	Y	16.8	3
SB	0.0%	0.0%		0	0	.950	0	Y	16.8	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1										‡	‡			‡	‡		46.0	4	P
2	‡	‡	‡														16.0	4	P

CYCLE= 70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	10	35	30	.950	11	37	32
WB	0	0	0	.950	429	791	0
NB	0	400	50	.950	0	421	53
SB	60	455	0	.950	63	479	0

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT-TH-RT	79	2	1.05	83	0.13	0.40
NB	TH-RT	474	1	1.00	474	0.00	0.11
SB	LT-TH	542	2	1.05	569	0.12	0.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	429	791	0	0	0	0	0	0	0	0
SOUTHBOUND	0	421	53	100	100	100	0	1	0	474

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT-TH-RT	1800	2	1.033	1.000	1.000	1.000	1.000	0.900	0.940	1.000	3147
NB	TH-RT	1800	1	1.100	1.000	1.000	1.000	1.000	0.900	0.885	1.000	1577
SB	LT-TH	1800	2	0.933	1.000	1.000	1.000	1.000	0.900	1.000	0.878	2655

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT
INPUT VARIABLES

DIR	C	G	N	Va	Vo	Vlt	Plt	No	Vo	Plto
SB	70	46	2	542	542	63	0.12	1	474	0.00

CALCULATIONS

DIR	Soo	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fa	Flt
SB	1800	0.263	37.429	0.579	0.321	8.571	0.679	3.422	1.943	0.756	0.878

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT-TH-RT	83	3147	0.03	0.23	719	0.12	*
NB	TH-RT	474	1577	0.30	0.66	1036	0.46	*
SB	LT-TH	569	2655	0.21	0.66	1745	0.33	

CYCLE= 70.0 LOST= 8.0 SUM V/S CRIT= 0.33 TOTAL V/C= 0.37

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT-TH-RT	0.12	0.23	70.0	16.26	719	0.00	1.00	16.26	C	1.2	2
NB	TH-RT	0.46	0.66	70.0	4.47	1036	0.23	1.00	4.70	A	3.2	3
SB	LT-TH	0.33	0.66	70.0	3.98	1745	0.04	1.00	4.02	A	3.6	4

DIR	Delay	LOS
EB	16.26	C
NB	4.70	A
SB	4.02	A

INTERSECTION DELAY = 5.21 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 70 TO 70 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 70.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 12.2 SECONDS
for chosen cycle length 70.0
suggested timing phase 1 is 57.0 secs green. 4.0 secs yellow + red clear
suggested timing phase 2 is 5.0 secs green. 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
HARRISON AVE/E.CONCORD ST
BUILD PM PEAK HOUR
date:03-07-1991 time:14:16:38
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=HACOB PM GEOMETRICS=HACOB PM SIGNAL=HACOB PM
LOCATED IN CBD:Y
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	10	35	30	0	2	0	0.0	13.0	0.0	39
WB	0	0	0	0	0	0	0.0	0.0	0.0	33
NB	0	400	55	0	1	0	0.0	15.0	0.0	39
SB	60	455	0	0	2	0	0.0	10.0	0.0	39

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	0.0%	N	0	0	.950	0	Y	16.8	3
WB	0.0%	0.0%		0	0	.950	0	Y	16.6	0
NB	0.0%	0.0%		0	0	.950	0	Y	16.8	3
SB	0.0%	0.0%		0	0	.950	0	Y	16.8	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1										*	*			*	*		46.0	4	P
2	*	*	*														16.0	4	P

CYCLE= 70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	10	35	30	.950	11	37	32
WB	0	0	0	.950	0	0	0
NB	0	400	55	.950	0	421	58
SB	60	455	0	.950	63	479	0

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT-TH-RT	79	2	1.05	83	0.13	0.40
NB	TH-RT	479	1	1.00	479	0.00	0.12
SB	LT-TH	542	2	1.05	569	0.12	0.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	0	0	0	0	0	0	0	0	0	0
SOUTHBOUND	0	421	58	100	100	100	0	1	0	479

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT-TH-RT	1800	2	1.033	1.000	1.000	1.000	1.000	0.900	0.940	1.000	3147
NB	TH-RT	1800	1	1.100	1.000	1.000	1.000	1.000	0.900	0.884	1.000	1575
SB	LT-TH	1800	2	0.933	1.000	1.000	1.000	1.000	0.900	1.000	0.876	2649

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT
INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Plt	No	Vo	Pltc
SB	70	46	2	542	542	63	0.12	1	479	0.00

CALCULATIONS

DIR	Soo	Yo	Gu	Fs	Fl	Gc	Pt	Gf	El	Fa	Fit
EB	1800	0.266	37.299	0.576	0.323	8.701	0.877	3.425	1.954	0.752	0.876

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT-TH-RT	83	3147	0.03	0.23	719	0.12	*
NB	TH-RT	479	1575	0.30	0.66	1035	0.46	*
SB	LT-TH	569	2649	0.21	0.66	1741	0.33	

CYCLE= 70.0 LOST= 8.0 SUM V/S CRIT= 0.33 TOTAL V/C= 0.37

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT-TH-RT	0.12	0.23	70.0	16.26	719	0.00	1.00	16.26	C	1.2	2
NB	TH-RT	0.46	0.66	70.0	4.49	1035	0.25	1.00	4.74	A	3.2	3
SB	LT-TH	0.33	0.66	70.0	3.98	1741	0.04	1.00	4.02	A	3.6	4

DIR	Delay	LOS
EB	16.26	C
NB	4.74	A
SB	4.02	A

INTERSECTION DELAY = 5.22 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 70 TO 70 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 70.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 12.3 SECONDS
for chosen cycle length 70.0
suggested timing phase 1 is 57.1 secs green. 4.0 secs yellow + red clear
suggested timing phase 2 is 4.9 secs green. 4.0 secs yellow + red clear

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CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND WASHINGTON ST
EXISTING CONDITIONS AM PEAK HOUR
date:01-29-1991              time:11:07:19
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=mawaexam   GEOMETRICS=mawaexam   SIGNAL=mawaexam
LOCATED IN CBD:N
VOLUME & GEOMETRICS
        VOLUMES      # OF LANES     LANE WIDTH     CROSS
DIR  LT   TH   RT    LT TH RT      LT   TH   RT    WALK
EB   64  913   69     1  2  0    10.0 13.0  0.0    37
WB   31 1139   72     0  3  0     0.0 11.0  0.0    32
NB   71  550   22     1  2  0    12.0 14.0  0.0    53
SB   15  164   59     1  2  0    11.0 10.0  0.0    57

TRAFFIC & ROADWAY CONDITIONS
                    ADJ PARK              PEDESTRIANS        ARR
DIR GRADE %HV   Y/N MOVES BUSES  PHF CROSS BUT MIN TIME TYPE
EB  0.0%  0.0%   Y     0    0   .950    0        16.3    3
WB  0.0%  0.0%   Y     0    0   .950    0        16.3    3
NB  0.0%  0.0%   N     0    0   .950    0        21.3    3
SB  0.0%  0.0%   N     0    0   .950    0        21.3    3

PHASINGS
    EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  Y+R PRE/ACT
    l  t  r  p  l  t  r  p  l  t  r  p  l  t  r  p
 1              :  :  :                                 6.0   0    P
 2  :  :  :     :  :  :                                63.0   4    P
 3                         :  :  :     :  :  :         20.0   4    P

CYCLE=  97.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTFR THFR RTFR
EB    64  913   69  .950    67  961   73
WB    31 1139   72  .950    33 1199   76
NB    71  550   22  .950    75  579   23
SB    15  164   59  .950    16  173   62

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Plt  Prt
EB  LT          67 1 1.00   67 1.00 0.00
EB  TH-RT     1034 2 1.05 1085 0.00 0.07
WB  LT-TH-RT  1307 3 1.10 1438 0.02 0.06
NB  LT          75 1 1.00   75 1.00 0.00
NB  TH-RT      602 2 1.05  632 0.00 0.04
SB  LT          16 1 1.00   16 1.00 0.00
SB  TH-RT      235 2 1.05  246 0.00 0.26

PART 3 (OPPOSING VOLUME ADJUSTMENTS)
LEFT TURN                 OPPOSING APPROACH
BEING OPPOSED        VOLUMES      % OPPOSING LEFT TURN    # LANES     OPPOSING
                  LT   TH   RT        LT   TH   RT       LT  TH  RT     VOLUME
EASTBOUND         33 1199   76        91   91   91        0   3   0     1194
WESTBOUND         67  961   73       100  100  100        1   2   0     1034
NORTHBOUND        16  173   62       100  100  100        1   2   0      235
SOUTHBOUND        75  579   23       100  100  100        1   2   0      602

SATURATION FLOW ADJUSTMENT WORKSHEET
DIR LN GROUP  IDEAL N  Fwid   Fhv   Fgr Fpark Fbus Farea  Frt   Flt    s
EB  LT        1800  1 0.933 1.000 1.000 1.000 1.000 1.000 1.000 0.158  266
```

EB	TH-RT	1800	2	1.033	1.000	1.000	1.000	1.000	1.000	0.989	1.000	3681
WB	LT-TH-RT	1800	3	0.967	1.000	1.000	1.000	1.000	1.000	0.991	0.955	4944
NB	LT	1800	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.674	1212
NB	TH-RT	1800	2	1.067	1.000	1.000	1.000	1.000	1.000	0.994	1.000	3818
SB	LT	1800	1	0.967	1.000	1.000	1.000	1.000	1.000	1.000	0.301	523
SB	TH-RT	1800	2	0.933	1.000	1.000	1.000	1.000	1.000	0.960	1.000	3227

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Plt	No	Vo	Pltc
EB	97	63	1	67	1034	67	1.00	3	1194	0.02
NB	97	20	1	75	602	75	1.00	2	235	0.00
SB	97	20	1	16	235	16	1.00	2	602	0.00

CALCULATIONS

DIR	Sao	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fm	Flt
EB	4919	0.243	52.107	0.129	1.000	10.893	0.000	0.000	8.724	0.158	0.158
NB	3600	0.065	14.629	0.728	1.000	5.371	0.000	0.000	1.545	0.674	0.674
SB	3600	0.167	4.535	0.499	1.000	15.465	0.000	0.000	2.256	0.301	0.301

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	67	266	0.25	0.65	173	0.39	
EB	TH-RT	1085	3681	0.29	0.65	2391	0.45	*
WB	LT-TH-RT	1438	4944	0.29	0.71	3517	0.41	
NB	LT	75	1212	0.06	0.21	250	0.30	
NB	TH-RT	632	3818	0.17	0.21	787	0.80	*
SB	LT	16	523	0.03	0.21	108	0.15	
SB	TH-RT	246	3227	0.08	0.21	665	0.37	

CYCLE= 97.0 LOST= 8.0 SUM V/S CRIT= 0.46 TOTAL V/C= 0.50

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.39	0.65	97.0	6.07	173	0.76	1.00	6.83	B	0.6	1
EB	TH-RT	0.45	0.65	97.0	6.42	2391	0.10	1.00	6.52	B	9.8	10
WB	LT-TH-RT	0.41	0.71	97.0	4.33	3517	0.05	1.00	4.38	A	10.2	10
NB	LT	0.30	0.21	97.0	24.75	250	0.21	1.00	24.96	C	1.6	2
NB	TH-RT	0.80	0.21	97.0	27.84	787	4.22	1.00	32.06	D	12.9	17
SB	LT	0.15	0.21	97.0	23.95	108	0.05	1.00	24.00	C	0.3	1
SB	TH-RT	0.37	0.21	97.0	25.15	665	0.17	1.00	25.32	D	5.0	6

DIR	Delay	LOS
EB	6.54	B
WB	4.38	A
NB	31.31	D
SB	25.24	D

INTERSECTION DELAY = 11.96 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 97 TO 97 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 97.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 15.5 SECONDS
for chosen cycle length 97.0
suggested timing phase 1 is 0.0 secs green, 0.0 secs yellow + red clear
suggested timing phase 2 is 57.0 secs green, 4.0 secs yellow + red clear
suggested timing phase 3 is 32.0 secs green, 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND WASHINGTON ST
FUTURE 2000 NO-BUILD AM PEAK HOUR OPTIMIZED TIMINGS
date:03-01-1991 time:14:24:17
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAWANBAM GEOMETRICS=MAWANBAM SIGNAL=MAWANBAM
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	65	955	70	1	2	0	10.0	13.0	0.0	37
WB	35	1165	80	0	3	0	0.0	11.0	0.0	32
NB	75	555	30	1	2	0	12.0	14.0	0.0	53
SB	20	165	65	1	2	0	11.0	10.0	0.0	57

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK			PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT MIN TIME	TYPE
EB	0.0%	0.0%	Y	0	0	.950	0	16.3	3
WB	0.0%	0.0%	Y	0	0	.950	0	16.3	3
NB	0.0%	0.0%	N	0	0	.950	0	21.3	3
SB	0.0%	0.0%	N	0	0	.950	0	21.3	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1					*	*	*										0.0	0	P
2	*	*	*		*	*	*										77.3	4	P
3									*	*	*		*	*	*		24.7	4	P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	65	955	70	.950	68	1005	74
WB	35	1165	80	.950	37	1226	84
NB	75	555	30	.950	79	584	32
SB	20	165	65	.950	21	174	68

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	68	1	1.00	68	1.00	0.00
EB	TH-RT	1079	2	1.05	1133	0.00	0.07
WB	LT-TH-RT	1347	3	1.10	1482	0.03	0.06
NB	LT	79	1	1.00	79	1.00	0.00
NB	TH-RT	616	2	1.05	647	0.00	0.05
SB	LT	21	1	1.00	21	1.00	0.00
SB	TH-RT	242	2	1.05	254	0.00	0.28

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	37	1226	84	100	100	100	0	3	0	1347
WESTBOUND	68	1005	74	100	100	100	1	2	0	1079
NORTHBOUND	21	174	68	100	100	100	1	2	0	242
SOUTHBOUND	79	584	32	100	100	100	1	2	0	616

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT	1900	1	0.933	1.000	1.000	1.000	1.000	1.000	1.000	0.076	128

EB	TH-RT	1800	2	1.033	1.000	1.000	1.000	1.000	1.000	0.990	1.000	3582
WB	LT-TH-RT	1800	3	0.967	1.000	1.000	1.000	1.000	1.000	0.991	0.943	4878
NB	LT	1800	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.645	1161
NB	TH-RT	1800	2	1.067	1.000	1.000	1.000	1.000	1.000	0.992	1.000	3810
SB	LT	1800	1	0.967	1.000	1.000	1.000	1.000	1.000	1.000	0.287	500
SB	TH-RT	1800	2	0.933	1.000	1.000	1.000	1.000	1.000	0.956	1.000	3218

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Plt	No	Vo	Pltc
EB	110	77	1	68	1079	68	1.00	3	1347	0.03
WB	110	25	1	79	616	79	1.00	2	242	0.00
SB	110	25	1	21	242	21	1.00	2	616	0.00

CALCULATIONS

DIR	Sop	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fm	Flt
EB	4796	0.281	64.490	0.033	1.000	12.786	0.000	0.000	34.200	0.076	0.076
WB	3600	0.067	18.576	0.724	1.000	6.148	0.000	0.000	1.555	0.645	0.645
SB	3600	0.171	7.128	0.490	1.000	17.597	0.000	0.000	2.295	0.287	0.287

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	68	128	0.53	0.70	90	0.76	*
EB	TH-RT	1133	3682	0.31	0.70	2587	0.44	
WB	LT-TH-RT	1482	4878	0.30	0.70	3427	0.43	
NB	LT	79	1161	0.07	0.22	261	0.30	
NB	TH-RT	647	3810	0.17	0.22	856	0.75	*
SB	LT	21	500	0.04	0.22	112	0.19	
SB	TH-RT	254	3218	0.08	0.22	723	0.35	

CYCLE=110.0 LOST= 8.0 SUM V/S CRIT= 0.70 TOTAL V/C= 0.76

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.76	0.70	110.0	7.95	90	20.04	1.00	27.99	D	0.8	2
EB	TH-RT	0.44	0.70	110.0	5.34	2587	0.08	1.00	5.42	B	9.8	10
WB	LT-TH-RT	0.43	0.70	110.0	5.31	3427	0.06	1.00	5.37	B	12.2	12
NB	LT	0.30	0.22	110.0	26.95	261	0.21	1.00	27.16	D	1.9	3
NB	TH-RT	0.75	0.22	110.0	30.26	856	2.69	1.00	32.94	D	14.6	18
SB	LT	0.19	0.22	110.0	26.23	112	0.10	1.00	26.32	D	0.5	1
SB	TH-RT	0.35	0.22	110.0	27.28	723	0.13	1.00	27.40	D	5.7	6

DIR	Delay	LOS
EB	6.71	B
WB	5.37	B
NB	32.31	D
SB	27.32	D

INTERSECTION DELAY = 12.75 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 30.9 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 0.0 secs green. 0.0 secs yellow + red clear
suggested timing phase 2 is 77.4 secs green. 4.0 secs yellow + red clear
suggested timing phase 3 is 24.6 secs green. 4.0 secs yellow + red clear

```
TINY PROGRAM (VERSION DATE 4-29-88)
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MAIN AVE AND WASHINGTON ST
FUTURE BUILD AM PEAK
DATE:04-12-1991              TIME:10:56:52
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAWAEAM    GEOMETRICS=MAWAEAM    SIGNAL=MAWAEAM
LOCATED IN CBD:A
VOLUME & GEOMETRICS
```

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	65	1005	70	1	2	0	10.0	13.0	0.0	37
WB	35	1170	80	0	3	0	0.0	11.0	0.0	32
NB	75	555	30	1	2	0	12.0	14.0	0.0	53
SB	20	165	65	1	2	0	11.0	10.0	0.0	57

```
TRAFFIC & ROADWAY CONDITIONS
```

			ADJ PARK				PEDESTRIANS		ARR
DIR	GRADE	%-V	Y/N	MOVES	BUSES	PHF	CROSS	BUT MIN TIME	TYPE
EB	0.0%	0.0%	Y	0	0	.950	0	16.7	3
WB	0.0%	0.0%	Y	0	0	.950	0	16.7	3
NB	0.0%	0.0%	N	0	0	.950	0	21.3	3
SB	0.0%	0.0%	N	0	0	.950	0	21.3	3

```
PHASING
   EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  YR PREV-ACT
   l t r p  l t r p  l t r p  l t r p
 1 * * *    * * *                          74.9   3    F
 2                        * * *    * * *    28.1   3    F

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTFR THFR RTFR
EB    65 1005   70  .950    68 1058   74
WB    35 1170   80  .950    37 1232   84
NB    75  555   30  .950    79  584   32
SB    20  165   65  .950    21  174   68

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Flt  Frt
EB  LT          68 1 1.00   68 1.00 0.00
EB  TH-RT     1132 2 1.05 1188 0.00 0.07
WB  LT-TH-RT  1232 3 1.10 1468 0.03 0.06
NB  LT          79 1 1.00   79 1.00 0.00
NB  TH-RT      616 2 1.05  647 0.00 0.05
SB  LT          21 1 1.00   21 1.00 0.00
SB  TH-RT      242 2 1.05  254 0.00 0.28

PART 3 (OPPOSING VOLUME ADJUSTMENTS
LEFT TURN                 OPPOSING APPROACH
BEING OPPOSED        VOLUMES       % OPPOSING LEFT TURN    # LANES     OPPOSING
                   LT   TH   RT        LT   TH   RT       LT  TH  RT    VOLUME
EASTBOUND          37 1232   84       100  100  100       0   3   0     1350
WESTBOUND          68 1058   74       100  100  100       1   2   0     1132
NORTHBOUND         21  174   68       100  100  100       1   2   0      242
SOUTHBOUND         79  584   32       100  100  100       1   2   0      616

SATURATION FLOW ADJUSTMENT WORKSHEET
DIR LN GROUP  IDEAL N  Flt   Fhv   Fgr Fbpb Fbus Farea  Frt   Flt    s
EB  LT        1900 1 0.970 1.000 1.000 1.000 1.000 1.000 1.000 1.000  [illegible]
EB  TH-RT     1900 2 1.000 1.000 1.000 1.000 1.000 1.000 0.990 1.000  [illegible]
[illegible]
```

NB	LT	1800	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.244	1159	
NB	TH-RT	1800	2	1.067	1.000	1.000	1.000	1.000	1.000	0.992	1.000		3810	
SB	LT	1800	1	0.967	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.281	489	
SB	TH-RT	1800	2	0.933	1.000	1.000	1.000	1.000	1.000	0.958	1.000		3218	

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vo	Vlt	Plt	No	Vo	Pltp
EB	110	80	1	68	1132	68	1.00	3	1353	0.03
WB	110	80	3	1353	1353	37	0.03	2	1132	0.00
NB	110	24	1	79	616	79	1.00	2	242	0.00
SB	110	24	1	21	242	21	1.00	2	616	0.00

CALCULATIONS

DIR	Sos	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fa	Flt
EB	4674	0.289	67.636	0.030	1.000	12.261	0.000	0.000	38.000	0.072	0.072
WB	3600	0.314	66.097	0.168	0.306	13.800	0.694	4.164	6.706	0.386	0.795
NB	3600	0.067	17.910	0.724	1.000	6.193	0.000	0.000	1.555	0.644	*0.644
SB	3600	0.171	6.376	0.490	1.000	17.725	0.000	0.000	2.295	0.281	0.281

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	o/C	c	v/c	CRITICAL
EB	LT	68	122	0.56	0.73	88	0.78	*
EB	TH-RT	1186	3684	0.32	0.73	2676	0.44	
WB	LT-TH-RT	1488	4113	0.36	0.73	2987	0.50	
NB	LT	79	1159	0.07	0.22	254	0.31	
NB	TH-RT	647	3810	0.17	0.22	835	0.77	*
SB	LT	21	489	0.04	0.22	107	0.20	
SB	TH-RT	254	3218	0.08	0.22	705	0.36	

CYCLE=110.0 LOST= 6.0 SUM V/S CRIT= 0.73 TOTAL V/C= 0.77

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	o/C	C	d1	c	d2	FF	Delay	LOS	Avg Q	95% Q
EB	LT	0.78	0.73	110.0	7.16	88	22.06	1.00	29.22	D	0.8	2
EB	TH-RT	0.44	0.73	110.0	4.62	2676	0.08	1.00	4.70	A	9.5	9
WB	LT-TH-RT	0.50	0.73	110.0	4.91	2987	0.11	1.00	5.02	B	11.3	11
NB	LT	0.31	0.22	110.0	27.35	254	0.24	1.00	27.59	D	1.9	3
NB	TH-RT	0.77	0.22	110.0	30.70	835	3.19	1.00	33.89	D	14.7	18
SB	LT	0.20	0.22	110.0	26.63	107	0.12	1.00	26.75	D	0.5	1
SB	TH-RT	0.36	0.22	110.0	27.68	705	0.14	1.00	27.82	D	5.8	6

DIR	Delay	LOS
EB	6.04	B
WB	5.02	B
NB	33.21	D
SB	27.74	D

INTERSECTION DELAY = 12.49 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 26.2 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 79.9 secs green. 3.0 secs yellow + red clear
suggested timing phase 2 is 24.1 secs green. 3.0 secs yellow + red clear

This procedure was completed at 23:12:35CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND WASHINGTON ST
EXISTING CONDITIONS PM PEAK HOUR
date:01-29-1991 time:11:12:21
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=mawaexpm GEOMETRICS=mawaexpm SIGNAL=mawaexpm
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	38	1172	92	1	2	0	10.0	13.0	0.0	37
WB	32	895	33	0	3	0	0.0	11.0	0.0	32
NB	100	292	34	1	2	0	12.0	14.0	0.0	53
SB	53	473	90	1	2	0	11.0	10.0	0.0	57

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS		ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT MIN TIME	TYPE
EB	0.0%	0.0%	Y	0	0	.950	0	16.3	3
WB	0.0%	0.0%	Y	0	0	.950	0	16.3	3
NB	0.0%	0.0%	N	0	0	.950	0	21.3	3
SB	0.0%	0.0%	N	0	0	.950	0	21.3	3

PHASINGS

	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			GREEN	Y+R	PRE/ACT
	l	t	r	l	t	r	l	t	r	l	t	r			
1				*	*	*							10.0	0	P
2	*	*	*	*	*	*							56.0	3	P
3							*	*	*	*	*	*	25.0	3	P

CYCLE= 97.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	38	1172	92	.950	40	1234	97
WB	32	895	33	.950	34	942	35
NB	100	292	34	.950	105	307	36
SB	53	473	90	.950	56	498	95

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	40	1	1.00	40	1.00	0.00
EB	TH-RT	1331	2	1.05	1397	0.00	0.07
WB	LT-TH-RT	1011	3	1.10	1112	0.03	0.03
NB	LT	105	1	1.00	105	1.00	0.00
NB	TH-RT	343	2	1.05	360	0.00	0.10
SB	LT	56	1	1.00	56	1.00	0.00
SB	TH-RT	593	2	1.05	622	0.00	0.16

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	34	942	35	85	85	85	0	3	0	857
WESTBOUND	40	1234	97	100	100	100	1	2	0	1331
NORTHBOUND	56	498	95	100	100	100	1	2	0	593
SOUTHBOUND	105	307	36	100	100	100	1	2	0	343

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	For	Fpark	Fbus	Farea	Frt	Flt	s

EB	LT	1800	1	0.933	1.000	1.000	1.000	1.000	1.000	1.000	0.282	475
EB	TH-RT	1800	2	1.033	1.000	1.000	1.000	1.000	1.000	0.989	1.000	3679
WB	LT-TH-RT	1800	3	0.967	1.000	1.000	1.000	1.000	1.000	0.995	0.869	4512
NB	LT	1800	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.354	637
NB	TH-RT	1800	2	1.067	1.000	1.000	1.000	1.000	1.000	0.984	1.000	3780
SB	LT	1800	1	0.967	1.000	1.000	1.000	1.000	1.000	1.000	0.569	990
SB	TH-RT	1800	2	0.933	1.000	1.000	1.000	1.000	1.000	0.976	1.000	3279

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Va	Vlt	Plt	No	Vo	Plto
EB	97	56	1	40	1331	40	1.00	3	857	0.03
WB	97	25	1	105	343	105	1.00	2	593	0.00
SB	97	25	1	56	593	56	1.00	2	343	0.00

CALCULATIONS

DIR	Sao	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fa	Flt
EB	2950	0.291	39.203	0.339	1.000	16.797	0.000	0.000	3.317	0.282	0.282
WB	3600	0.165	10.812	0.505	1.000	14.188	0.000	0.000	2.229	0.354	0.354
SB	3600	0.095	17.414	0.661	1.000	7.586	0.000	0.000	1.703	0.569	0.569

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	40	475	0.08	0.58	274	0.15	
EB	TH-RT	1397	3679	0.38	0.58	2124	0.66	*
WB	LT-TH-RT	1112	4512	0.25	0.68	3070	0.36	
NB	LT	105	637	0.17	0.26	164	0.64	
NB	TH-RT	360	3780	0.10	0.26	974	0.37	
SB	LT	56	990	0.06	0.26	255	0.22	
SB	TH-RT	622	3279	0.19	0.26	845	0.74	*

CYCLE= 97.0 LOST= 6.0 SUM V/S CRIT= 0.57 TOTAL V/C= 0.61

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.15	0.58	97.0	7.19	274	0.02	1.00	7.21	B	0.5	1
EB	TH-RT	0.66	0.58	97.0	10.62	2124	0.54	1.00	11.15	B	15.2	15
WB	LT-TH-RT	0.36	0.68	97.0	5.00	3070	0.03	1.00	5.03	B	8.7	9
NB	LT	0.64	0.26	97.0	24.33	164	5.57	1.00	29.90	D	2.1	3
NB	TH-RT	0.37	0.26	97.0	22.45	974	0.11	1.00	22.56	C	6.9	7
SB	LT	0.22	0.26	97.0	21.52	255	0.07	1.00	21.59	C	1.1	2
SB	TH-RT	0.74	0.26	97.0	25.06	845	2.36	1.00	27.43	D	11.9	14

DIR	Delay	LOS
EB	11.04	B
WB	5.03	B
NB	24.22	C
SB	26.95	D

INTERSECTION DELAY = 13.81 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 97 TO 97 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 97.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 15.0 SECONDS
for chosen cycle length 97.0
suggested timing phase 1 is 0.0 secs green, 0.0 secs yellow + red clear
suggested timing phase 2 is 60.7 secs green, 3.0 secs yellow + red clear
suggested timing phase 3 is 30.3 secs green, 3.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND WASHINGTON ST
FUTURE NO-BUILD PM PEAK HOUR - OPTIMIZED TIMINGS
date:03-01-1991 time:16:51:50
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAWANBPM GEOMETRICS=MAWANBPM SIGNAL=MAWAN1PM
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	40	1160	90	1	2	0	10.0	13.0	0.0	37
WB	35	945	45	0	3	0	0.0	11.0	0.0	32
NB	100	295	35	1	2	0	12.0	14.0	0.0	53
SB	10	475	95	1	2	0	11.0	10.0	0.0	57

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK			PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT MIN TIME	TYPE
EB	0.0%	0.0%	Y	0	0	.950	0	16.3	3
WB	0.0%	0.0%	Y	0	0	.950	0	16.3	3
NB	0.0%	0.0%	N	0	0	.950	0	21.3	3
SB	0.0%	0.0%	N	0	0	.950	0	21.3	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1					*	*	*										0.0	0	P
2	*	*	*		*	*	*										68.8	3	P
3									*	*	*		*	*	*		35.2	3	P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	40	1160	90	.950	42	1221	95
WB	35	945	45	.950	37	995	47
NB	100	295	35	.950	105	311	37
SB	10	475	95	.950	11	500	100

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	PIt	Prt
EB	LT	42	1	1.00	42	1.00	0.00
EB	TH-RT	1316	2	1.05	1382	0.00	0.07
WB	LT-TH-RT	1079	3	1.10	1187	0.03	0.04
NB	LT	105	1	1.00	105	1.00	0.00
NB	TH-RT	347	2	1.05	365	0.00	0.11
SB	LT	11	1	1.00	11	1.00	0.00
SB	TH-RT	600	2	1.05	630	0.00	0.17

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	37	995	47	100	100	100	0	3	0	1079
WESTBOUND	42	1221	95	100	100	100	1	2	0	1316
NORTHBOUND	11	500	100	100	100	100	1	2	0	600
SOUTHBOUND	105	311	37	100	100	100	1	2	0	347

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT	1800	1	0.933	1.000	1.000	1.000	1.000	1.000	1.000	0.182	305

EB	TH-RT	1800	2	1.033	1.000	1.000	1.000	1.000	1.000	0.989	1.000	3680
WB	LT-TH-RT	1800	3	0.967	1.000	1.000	1.000	1.000	1.000	0.993	0.866	4492
NB	LT	1800	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.369	665
NB	TH-RT	1800	2	1.067	1.000	1.000	1.000	1.000	1.000	0.984	1.000	3779
SB	LT	1800	1	0.967	1.000	1.000	1.000	1.000	1.000	1.000	0.566	984
SB	TH-RT	1800	2	0.933	1.000	1.000	1.000	1.000	1.000	0.975	1.000	3276

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vo	Vlt	Plt	No	Vo	Plto
EB	110	69	1	42	1316	42	1.00	3	1079	0.03
WB	110	35	1	105	347	105	1.00	2	600	0.00
SB	110	35	1	11	600	11	1.00	2	347	0.00

CALCULATIONS

DIR	Soo	Yo	Go	Fs	Pl	Go	Pt	Gf	El	Fo	Flt
EB	3184	0.339	47.648	0.201	1.000	21.126	0.000	0.000	5.607	0.182	0.182
WB	3600	0.167	20.272	0.500	1.000	14.955	0.000	0.000	2.250	0.369	0.369
SB	3600	0.096	27.241	0.658	1.000	7.986	0.000	0.000	1.710	0.566	0.566

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	42	305	0.14	0.63	191	0.22	
EB	TH-RT	1382	3680	0.38	0.63	2301	0.60	*
WB	LT-TH-RT	1187	4492	0.26	0.63	2808	0.42	
NB	LT	105	665	0.16	0.32	213	0.49	
NB	TH-RT	365	3779	0.10	0.32	1210	0.30	
SB	LT	11	984	0.01	0.32	315	0.03	
SB	TH-RT	630	3276	0.19	0.32	1049	0.60	*

CYCLE=110.0 LOST= 6.0 SUM V/S CRIT= 0.57 TOTAL V/C= 0.60

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.22	0.63	110.0	6.81	191	0.10	1.00	6.91	B	0.5	1
EB	TH-RT	0.60	0.63	110.0	9.40	2301	0.32	1.00	9.72	B	15.1	15
WB	LT-TH-RT	0.42	0.63	110.0	7.98	2808	0.06	1.00	8.04	B	12.4	12
NB	LT	0.49	0.32	110.0	22.95	213	1.50	1.00	24.45	C	2.2	3
NB	TH-RT	0.30	0.32	110.0	21.38	1210	0.04	1.00	21.42	C	7.2	7
SB	LT	0.03	0.32	110.0	19.52	315	0.00	1.00	19.52	C	0.2	1
SB	TH-RT	0.60	0.32	110.0	23.91	1049	0.71	1.00	24.62	C	12.5	13

DIR	Delay	LOS
EB	9.64	B
WB	8.04	B
NB	22.10	C
SB	24.53	C

INTERSECTION DELAY = 13.27 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 14.9 SECONDS
THE EXISTING TIMING IS OPTIMAL

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND WASHINGTON ST
FUTURE BUILD PM PEAK
date:04-22-1991 time:10:47:25
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAWABPM GEOMETRICS=MAWABPM SIGNAL=MAWABPM
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	40	1170	90	1	2	0	10.0	13.0	0.0	37
WB	35	990	45	0	3	0	0.0	11.0	0.0	32
NB	100	295	35	1	2	0	12.0	14.0	0.0	53
SB	10	475	95	1	2	0	11.0	10.0	0.0	57

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	0.0%	Y	0	0	.950	0		16.3	3
WB	0.0%	0.0%	Y	0	0	.950	0		16.3	3
NB	0.0%	0.0%	N	0	0	.950	0		21.3	3
SB	0.0%	0.0%	N	0	0	.950	0		21.3	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1	*	*	*		*	*	*										69.0	3	F
2									*	*	*		*	*	*		35.0	3	P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFF	THFR	RTFR
EB	40	1170	90	.950	42	1232	95
WB	35	990	45	.950	37	1042	47
NB	100	295	35	.950	105	311	37
SB	10	475	95	.950	11	500	100

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	42	1	1.00	42	1.00	0.00
EB	TH-RT	1326	2	1.05	1393	0.00	0.07
WB	LT-TH-RT	1126	3	1.10	1239	0.03	0.04
NB	LT	105	1	1.00	105	1.00	0.00
NB	TH-RT	347	2	1.05	365	0.00	0.11
SB	LT	11	1	1.00	11	1.00	0.00
SB	TH-RT	600	2	1.05	630	0.00	0.17

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	37	1042	47	100	100	100	0	3	0	1126
WESTBOUND	42	1232	95	100	100	100	1	2	0	1326
NORTHBOUND	11	500	100	100	100	100	1	2	0	600
SOUTHBOUND	105	311	37	100	100	100	1	2	0	347

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwlc	Fhv	Fgr	Fpark	Fpus	Farea	Frt	Flt	s
EB	LT	1800	1	0.933	1.000	1.000	1.000	1.000	1.000	1.000	0.157	264
EB	TH-RT	1800	2	1.033	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

WB	LT-TH-RT	1800	3	0.967	1.000	1.000	1.000	1.000	1.000	0.994	0.699	3627	
NB	LT	1800	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.368	663	
NB	TH-RT	1800	2	1.067	1.000	1.000	1.000	1.000	1.000	0.954	1.000	3779	
SB	LT	1800	1	0.967	1.000	1.000	1.000	1.000	1.000	0.365		984	
SB	TH-RT	1800	2	0.933	1.000	1.000	1.000	1.000	1.000	0.975	1.000	3276	

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vo	Vlt	Plt	No	Vo	Plto
EB	110	69	1	42	1326	42	1.00	3	1326	0.03
WB	110	69	3	1126	1126	37	0.03	2	1326	0.00
NB	110	35	1	105	347	105	1.00	2	600	0.00
SB	110	35	1	11	600	11	1.00	2	347	0.00

CALCULATIONS

DIR	Soo	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fm	Flt
EB	3057	0.368	45.015	0.171	1.000	23.942	0.000	0.000	6.577	0.157	0.157
WB	3600	0.368	45.015	0.046	0.719	23.942	0.281	0.782	24.429	0.096	0.699
NB	3600	0.167	20.052	0.500	1.000	14.991	0.000	0.000	2.250	0.368	0.368
SB	3600	0.096	27.038	0.658	1.000	8.005	0.000	0.000	1.710	0.565	0.565

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	o/C	c	v/c	CRITICAL
EB	LT	42	264	0.16	0.63	166	0.25	
EB	TH-RT	1393	3680	0.38	0.63	2307	0.60	*
WB	LT-TH-RT	1239	3627	0.34	0.63	2274	0.54	
NB	LT	105	663	0.16	0.32	211	0.50	
NB	TH-RT	365	3779	0.10	0.32	1204	0.30	
SB	LT	11	984	0.01	0.32	313	0.03	
SB	TH-RT	630	3276	0.19	0.32	1044	0.60	*

CYCLE=110.0 LOST= 6.0 SUM V/S CRIT= 0.57 TOTAL V/C= 0.60

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	o/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.25	0.63	110.0	6.92	166	0.16	1.00	7.10	B	0.5	1
EB	TH-RT	0.60	0.63	110.0	9.36	2307	0.33	1.00	9.69	B	15.1	15
WB	LT-TH-RT	0.54	0.63	110.0	6.84	2274	0.22	1.00	9.05	B	12.8	13
NB	LT	0.50	0.32	110.0	23.07	211	1.56	1.00	24.63	C	2.2	3
NB	TH-RT	0.30	0.32	110.0	21.48	1204	0.05	1.00	21.53	C	7.2	7
SB	LT	0.03	0.32	110.0	19.62	313	0.00	1.00	19.62	C	0.2	1
SB	TH-RT	0.60	0.32	110.0	24.03	1044	0.73	1.00	24.76	C	12.5	13

DIR	Delay	LOS
EB	9.62	B
WB	9.05	B
NB	22.22	C
SB	24.67	C

INTERSECTION DELAY = 13.55 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 15.0 SECONDS
THE EXISTING TIMING IS OPTIMAL

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND HARRISON AVE
EXISTING CONDITIONS AM PEAK HOUR
date:01-31-1991 time:10:37:13
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAHAEXAM GEOMETRICS=MAHAEXAM SIGNAL=MAHAEXAM
LOCATED IN CBD:N

VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	64	801	85	1	2	0	10.0	11.0	0.0	83
WB	30	1192	116	1	2	0	11.0	11.0	0.0	83
NB	24	281	21	1	1	0	12.0	12.0	0.0	40
SB	68	196	26	1	1	0	12.0	12.0	0.0	40

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	2.0%	Y	0	4	.940	20	N	27.8	3
WB	0.0%	2.0%	Y	0	4	.940	20	N	27.8	3
NB	0.0%	2.0%	N	0	0	.940	20	N	17.0	3
SB	0.0%	2.0%	N	0	0	.940	20	N	17.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1	*	*	*														17.0	0	P
2		*	*			*	*										37.0	0	P
3					*	*	*										9.0	4	P
4									*	*	*		*	*	*		29.0	4	P

CYCLE= 100.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	64	801	85	.940	68	852	90
WB	30	1192	116	.940	32	1268	123
NB	24	281	21	.940	26	299	22
SB	68	196	26	.940	72	209	28

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	PIt	Prt
EB	LT	68	1	1.00	68	1.00	0.00
EB	TH-RT	943	2	1.05	990	0.00	0.10
WB	LT	32	1	1.00	32	1.00	0.00
WB	TH-RT	1391	2	1.05	1461	0.00	0.09
NB	LT	26	1	1.00	26	1.00	0.00
NB	TH-RT	321	1	1.00	321	0.00	0.07
SB	LT	72	1	1.00	72	1.00	0.00
SB	TH-RT	236	1	1.00	236	0.00	0.1%

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	32	1268	123	0	0	0	1	2	0	0
WESTBOUND	68	852	90	0	0	0	1	2	0	0
NORTHBOUND	72	209	28	100	100	100	1	1	0	236
SOUTHBOUND	26	299	22	100	100	100	1	1	0	321

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	For	Fpark	Fbus	Farea	Frt	Flt	s

EB	LT	1800	1	0.933	0.990	1.000	1.000	1.000	1.000	1.000	0.950	1580
EB	TH-RT	1800	2	0.967	0.990	1.000	1.000	0.992	1.000	0.986	1.000	3368
WB	LT	1800	1	0.967	0.990	1.000	1.000	1.000	1.000	1.000	0.950	1637
WB	TH-RT	1800	2	0.967	0.990	1.000	1.000	0.992	1.000	0.987	1.000	3371
NB	LT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	1.000	0.545	972
NB	TH-RT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	0.990	1.000	1764
SB	LT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	1.000	0.418	746
SB	TH-RT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	0.982	1.000	1751

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	VIt	PIt	No	Vo	PIto
NB	100	29	1	26	321	26	1.00	1	236	0.00
SB	100	29	1	72	236	72	1.00	1	321	0.00

CALCULATIONS

DIR	Sco	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fm	Flt
NB	1800	0.131	18.278	0.727	1.000	10.722	0.000	0.000	1.547	0.545	0.545
SB	1800	0.178	13.574	0.674	1.000	15.426	0.000	0.000	1.669	0.418	0.418

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	68	1580	0.04	0.17	269	0.25	*
EB	TH-RT	990	3368	0.29	0.54	1819	0.54	
WB	LT	32	1637	0.02	0.09	147	0.22	
WB	TH-RT	1461	3371	0.43	0.46	1551	0.94	*
NB	LT	26	972	0.03	0.29	282	0.09	
NB	TH-RT	321	1764	0.18	0.29	511	0.63	*
SB	LT	72	746	0.10	0.29	216	0.33	
SB	TH-RT	236	1751	0.13	0.29	508	0.47	

CYCLE=100.0 LOST= 8.0 SUM V/S CRIT= 0.66 TOTAL V/C= 0.72

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.25	0.17	100.0	27.36	269	0.11	1.00	27.47	D	1.6	2
EB	TH-RT	0.54	0.54	100.0	11.39	1819	0.27	1.00	11.65	B	12.0	12
WB	LT	0.22	0.09	100.0	32.09	147	0.12	1.00	32.21	D	0.8	1
WB	TH-RT	0.94	0.46	100.0	19.56	1551	8.67	1.00	28.22	D	21.3	34
NB	LT	0.09	0.29	100.0	19.67	282	0.00	1.00	19.68	C	0.5	1
NB	TH-RT	0.63	0.29	100.0	23.42	511	1.74	1.00	25.17	D	6.3	8
SB	LT	0.33	0.29	100.0	21.21	216	0.36	1.00	21.57	C	1.4	2
SB	TH-RT	0.47	0.29	100.0	22.14	508	0.51	1.00	22.65	C	4.7	5

DIR	Delay	LOS
EB	12.67	B
WB	28.31	D
NB	24.76	C
SB	22.40	C

INTERSECTION DELAY = 22.20 INTERSECTION LOS=C

THE CYCLE LENGTH WITHIN THE BOUNDS OF 100 TO 100 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 100.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 26.1 SECONDS
for chosen cycle length 100.0
suggested timing phase 1 is 6.0 secs green, 0.0 secs yellow + red clear
suggested timing phase 2 is 28.9 secs green, 0.0 secs yellow + red clear
suggested timing phase 3 is 31.6 secs green, 4.0 secs yellow + red clear
suggested timing phase 4 is 25.4 secs green, 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND HARRISON AVE
FUTURE 2000 NO-BUILD AM PEAK HOUR OPTIMIZED TIMINGS
date:03-01-1991 time:14:32:39
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAHANBAM GEOMETRICS=MAHANBAM SIGNAL=MAHANBAM
LOCATED IN CBD:N

VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	95	805	95	1	2	0	10.0	11.0	0.0	83
WB	55	1210	180	1	2	0	11.0	11.0	0.0	83
NB	25	290	20	1	1	0	12.0	12.0	0.0	40
SB	90	205	45	1	1	0	12.0	12.0	0.0	40

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	2.0%	Y	0	4	.940	20	N	27.8	3
WB	0.0%	2.0%	Y	0	4	.940	20	N	27.8	3
NB	0.0%	2.0%	N	0	0	.940	20	N	17.0	3
SB	0.0%	2.0%	N	0	0	.940	20	N	17.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1	*	*	*														9.1	0	P
2		*	*				*	*									30.5	0	P
3					*	*	*										35.6	4	P
4									*	*	*		*	*	*		26.7	4	P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	95	805	95	.940	101	856	101
WB	55	1210	180	.940	59	1287	191
NB	25	290	20	.940	27	309	21
SB	90	205	45	.940	96	218	48

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	P1t	Prt
EB	LT	101	1	1.00	101	1.00	0.00
EB	TH-RT	957	2	1.05	1005	0.00	0.11
WB	LT	59	1	1.00	59	1.00	0.00
WB	TH-RT	1479	2	1.05	1553	0.00	0.13
NB	LT	27	1	1.00	27	1.00	0.00
NB	TH-RT	330	1	1.00	330	0.00	0.06
SB	LT	96	1	1.00	96	1.00	0.00
SB	TH-RT	266	1	1.00	266	0.00	0.18

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	59	1287	191	0	0	0	1	2	0	0
WESTBOUND	101	856	101	0	0	0	1	2	0	0
NORTHBOUND	96	218	48	100	100	100	1	1	0	266
SOUTHBOUND	27	309	21	100	100	100	1	1	0	330

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT	1800	1	0.933	0.990	1.000	1.000	1.000	1.000	1.000	0.950	1580
EB	TH-RT	1800	2	0.967	0.990	1.000	1.000	0.992	1.000	0.984	1.000	3363
WB	LT	1800	1	0.967	0.990	1.000	1.000	1.000	1.000	1.000	0.950	1637
WB	TH-RT	1800	2	0.967	0.990	1.000	1.000	0.992	1.000	0.981	1.000	3350
NB	LT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	1.000	0.439	782
NB	TH-RT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	0.990	1.000	1765
SB	LT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	1.000	0.328	585
SB	TH-RT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	0.973	1.000	1734

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Plt	Nq	Vo	Plto
NB	110	27	1	27	330	27	1.00	1	266	0.00
SB	110	27	1	96	266	96	1.00	1	330	0.00

CALCULATIONS

DIR	Soq	Yo	Gu	Fs	Pl	Gq	Pt	Gf	El	Fm	Flt
NB	1800	0.148	12.241	0.709	1.000	14.444	0.000	0.000	1.587	0.439	0.439
SB	1800	0.183	7.997	0.669	1.000	18.689	0.000	0.000	1.682	0.328	0.328

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	101	1580	0.06	0.08	131	0.77	*
EB	TH-RT	1005	3363	0.30	0.36	1213	0.83	
WB	LT	59	1637	0.04	0.32	530	0.11	
WB	TH-RT	1553	3350	0.46	0.60	2016	0.77	*
NB	LT	27	782	0.03	0.24	190	0.14	
NB	TH-RT	330	1765	0.19	0.24	428	0.77	*
SB	LT	96	585	0.16	0.24	142	0.68	
SB	TH-RT	266	1734	0.15	0.24	421	0.63	

CYCLE=110.0 LOST= 8.0 SUM V/S CRIT= 0.71 TOTAL V/C= 0.77

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.77	0.08	110.0	37.55	131	15.73	1.00	53.28	E	2.9	5
EB	TH-RT	0.83	0.36	110.0	24.37	1213	3.50	1.00	27.87	D	18.7	23
WB	LT	0.11	0.32	110.0	19.81	530	0.00	1.00	19.81	C	1.2	2
WB	TH-RT	0.77	0.60	110.0	12.36	2016	1.33	1.00	13.69	B	18.0	18
NB	LT	0.14	0.24	110.0	24.82	190	0.02	1.00	24.85	C	0.6	1
NB	TH-RT	0.77	0.24	110.0	29.49	428	5.73	1.00	35.22	D	7.6	11
SB	LT	0.68	0.24	110.0	28.68	142	7.99	1.00	36.67	D	2.2	4
SB	TH-RT	0.63	0.24	110.0	28.32	421	2.17	1.00	30.49	D	6.2	8

DIR	Delay	LOS
EB	30.19	D
WB	13.91	B
NB	34.45	D
SB	32.13	D

INTERSECTION DELAY = 23.20 INTERSECTION LOS=C

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 32.2 SECONDS
THE EXISTING TIMING IS OPTIMAL

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CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND HARRISON AVE
FUTURE BUILD AM PEAK
date:04-22-1991              time:11:04:30
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAHABAM    GEOMETRICS=MAHABAM    SIGNAL=MAHABAM
LOCATED IN CBD:N
VOLUME & GEOMETRICS
        VOLUMES       # OF LANES     LANE WIDTH     CROSS
DIR  LT   TH   RT    LT TH RT      LT   TH   RT     WALK
EB  110  840   95     1  2  0    10.0 11.0  0.0     83
WB   55 1215  180     1  2  0    11.0 11.0  0.0     83
NB   25  290   20     1  1  0    12.0 12.0  0.0     40
SB   90  205   45     1  1  0    12.0 12.0  0.0     40

TRAFFIC & ROADWAY CONDITIONS
                    ADJ PARK              PEDESTRIANS        ARR
DIR GRADE %HV   Y/N MOVES BUSES  PHF CROSS BUT MIN TIME TYPE
EB  0.0%  2.0%   Y     0     4  .940   20   N   27.6    3
WB  0.0%  2.0%   Y     0     4  .940   20   N   27.6    3
NB  0.0%  2.0%   N     0     0  .940   20   N   17.0    3
SB  0.0%  2.0%   N     0     0  .940   20   N   17.0    3

PHASINGS
    EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  Y+R PRE/ACT
    l t r p l t r p l t r p l t r p
 1  * * *                                          10.4   0    P
 2    * *       *  *                               30.2   0    P
 3            *  *  *                               35.2   4    P
 4                      *  *  *     *  *  *        26.3   4    P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTFR THFR RTFR
EB   110  840   95  .940   117  894  101
WB    55 1215  180  .940    59 1293  191
NB    25  290   20  .940    27  309   21
SB    90  205   45  .940    96  218   48

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Pit  Prt
EB  LT         117 1 1.00  117 1.00 0.00
EB  TH-RT      995 2 1.05 1044 0.00 0.10
WB  LT          59 1 1.00   59 1.00 0.00
WB  TH-RT     1484 2 1.05 1558 0.00 0.13
NB  LT          27 1 1.00   27 1.00 0.00
NB  TH-RT      330 1 1.00  330 0.00 0.06
SB  LT          96 1 1.00   96 1.00 0.00
SB  TH-RT      266 1 1.00  266 0.00 0.18

PART 3 (OPPOSING VOLUME ADJUSTMENTS)
LEFT TURN                OPPOSING APPROACH
BEING OPPOSED       VOLUMES      % OPPOSING LEFT TURN    # LANES     OPPOSING
                   LT   TH   RT        LT   TH   RT       LT  TH  RT    VOLUME
EASTBOUND          59 1293  191         0    0    0        1   2   0       0
WESTBOUND         117  894  101         0    0    0        1   2   0       0
NORTHBOUND         76  218   48       100  100  100        1   1   0     256
SOUTHBOUND         27  309   21       100  100  100        1   1   0     330

SATURATION FLOW ADJUSTMENT WORKSHEET
DIR LN GROUP  IDEAL N  Fwid   Fl   Fp Fbsc  Fbus Fprk   Fa   Fhv    g
```

EB	LT	1800	1	0.933	0.990	1.000	1.000	1.000	1.000	1.000	0.950	1550
EB	TH-RT	1800	2	0.967	0.990	1.000	1.000	0.992	1.000	0.985	1.000	3365
WB	LT	1800	1	0.967	0.990	1.000	1.000	1.000	1.000	1.000	0.950	1637
WB	TH-RT	1800	2	0.967	0.990	1.000	1.000	0.992	1.000	0.981	1.000	3351
NB	LT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	1.000	0.434	773
NB	TH-RT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	0.990	1.000	1765
SB	LT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	1.000	0.321	573
SB	TH-RT	1800	1	1.000	0.990	1.000	1.000	1.000	1.000	0.973	1.000	1734

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Plt	No	Vo	Pltc
NB	110	26	1	27	330	27	1.00	1	266	0.00
SB	110	26	1	96	266	96	1.00	1	330	0.00

CALCULATIONS

DIR	Sop	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fa	Flt
NB	1800	0.148	11.735	0.709	1.000	14.519	0.000	0.000	1.587	0.434	0.434
SB	1800	0.183	7.469	0.669	1.000	18.785	0.000	0.000	1.682	0.321	0.321

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	117	1580	0.07	0.09	149	0.78	*
EB	TH-RT	1044	3365	0.31	0.37	1241	0.84	
WB	LT	59	1637	0.04	0.32	523	0.11	
WB	TH-RT	1556	3351	0.47	0.59	1990	0.78	*
NB	LT	27	773	0.03	0.24	185	0.14	
NB	TH-RT	330	1765	0.19	0.24	421	0.78	*
SB	LT	96	573	0.17	0.24	137	0.70	
SB	TH-RT	266	1734	0.15	0.24	414	0.64	

CYCLE=110.0 LOST= 8.0 SUM V/S CRIT= 0.73 TOTAL V/C= 0.78

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.78	0.09	110.0	37.01	149	15.35	1.00	52.36	E	3.3	6
EB	TH-RT	0.84	0.37	110.0	24.15	1241	3.83	1.00	27.98	D	19.2	24
WB	LT	0.11	0.32	110.0	20.05	523	0.00	1.00	20.06	C	1.2	2
WB	TH-RT	0.78	0.59	110.0	12.88	1990	1.49	1.00	14.37	B	18.4	19
NB	LT	0.14	0.24	110.0	25.09	185	0.03	1.00	25.12	D	0.6	1
NB	TH-RT	0.78	0.24	110.0	29.80	421	6.38	1.00	36.17	D	7.7	11
SB	LT	0.70	0.24	110.0	29.09	137	9.72	1.00	38.81	D	2.2	4
SB	TH-RT	0.64	0.24	110.0	28.62	414	2.37	1.00	30.99	D	6.2	8

DIR	Delay	LOS
EB	30.43	D
WB	14.57	B
NB	35.35	D
SB	33.06	D

INTERSECTION DELAY = 23.87 INTERSECTION LOS=C

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 33.9 SECONDS
THE EXISTING TIMING IS OPTIMAL

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND HARRISON AVE
EXISTING CONDITIONS PM PEAK HOUR
date:01-31-1991 time:10:40:26
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAHAEXPM GEOMETRICS=MAHAEXPM SIGNAL=MAHAEXPM
LOCATED IN CBD:N

VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	120	1040	99	1	2	0	10.0	11.0	0.0	83
WB	181	836	33	1	2	0	11.0	11.0	0.0	83
NB	53	241	158	1	1	0	12.0	12.0	0.0	40
SB	20	246	71	1	1	0	12.0	12.0	0.0	40

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	3.0%	Y	0	4	.940	20	N	27.8	3
WB	0.0%	3.0%	Y	0	4	.940	20	N	27.8	3
NB	0.0%	3.0%	N	0	0	.940	20	N	17.0	3
SB	0.0%	3.0%	N	0	0	.940	20	N	17.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1	*	*	*														17.0	0	P
2		*	*			*	*										37.0	0	P
3					*	*	*										9.0	4	P
4									*	*	*		*	*	*		29.0	4	P

CYCLE= 100.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	120	1040	99	.940	128	1106	105
WB	181	836	33	.940	193	889	35
NB	53	241	158	.940	56	256	168
SB	20	246	71	.940	21	262	76

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	128	1	1.00	128	1.00	0.00
EB	TH-RT	1212	2	1.05	1272	0.00	0.09
WB	LT	193	1	1.00	193	1.00	0.00
WB	TH-RT	924	2	1.05	971	0.00	0.04
NB	LT	56	1	1.00	56	1.00	0.00
NB	TH-RT	424	1	1.00	424	0.00	0.40
SB	LT	21	1	1.00	21	1.00	0.00
SB	TH-RT	337	1	1.00	337	0.00	0.22

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	193	889	35	0	0	0	1	2	0	0
WESTBOUND	128	1106	105	0	0	0	1	2	0	0
NORTHBOUND	21	262	76	100	100	100	1	1	0	337
SOUTHBOUND	56	256	168	100	100	100	1	1	0	424

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT	1800	1	0.933	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1572
EB	TH-RT	1800	2	0.967	0.985	1.000	1.000	0.992	1.000	0.987	1.000	3356
WB	LT	1800	1	0.967	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1629
WB	TH-RT	1800	2	0.967	0.985	1.000	1.000	0.992	1.000	0.994	1.000	3381
NB	LT	1800	1	1.000	0.985	1.000	1.000	1.000	1.000	1.000	0.395	701
NB	TH-RT	1800	1	1.000	0.985	1.000	1.000	1.000	1.000	0.941	1.000	1668
SB	LT	1800	1	1.000	0.985	1.000	1.000	1.000	1.000	1.000	0.270	480
SB	TH-RT	1800	1	1.000	0.985	1.000	1.000	1.000	1.000	0.966	1.000	1714

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Plt	No	Vo	Plto
NB	100	29	1	56	424	56	1.00	1	337	0.00
SB	100	29	1	21	337	21	1.00	1	424	0.00

CALCULATIONS

DIR	Sao	Yo	Gu	Fs	PI	Go	Pt	Gf	EI	Fm	Flt
NB	1800	0.187	12.631	0.664	1.000	16.369	0.000	0.000	1.694	0.395	0.395
SB	1800	0.236	7.090	0.610	1.000	21.910	0.000	0.000	1.845	0.270	0.270

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	128	1572	0.08	0.17	267	0.48	
EB	TH-RT	1272	3356	0.38	0.54	1812	0.70	*
WB	LT	193	1629	0.12	0.09	147	1.31	*
WB	TH-RT	971	3381	0.29	0.46	1555	0.62	
NB	LT	56	701	0.08	0.29	203	0.28	
NB	TH-RT	424	1668	0.25	0.29	484	0.88	*
SB	LT	21	480	0.04	0.29	139	0.15	
SB	TH-RT	337	1714	0.20	0.29	497	0.68	

CYCLE=100.0 LOST= 8.0 SUM V/S CRIT= 0.75 TOTAL V/C= 0.82

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.48	0.17	100.0	28.49	267	1.05	1.00	29.54	D	2.9	4
EB	TH-RT	0.70	0.54	100.0	12.95	1812	0.87	1.00	13.82	B	15.5	15
WB	LT	1.31	0.09	100.0	35.69	147	240.49	1.00	276.18	F	17.2	45
WB	TH-RT	0.62	0.46	100.0	15.54	1555	0.57	1.00	16.11	C	13.9	14
NB	LT	0.28	0.29	100.0	20.83	203	0.20	1.00	21.03	C	1.1	2
NB	TH-RT	0.88	0.29	100.0	25.69	484	11.63	1.00	37.33	D	8.6	14
SB	LT	0.15	0.29	100.0	20.05	139	0.04	1.00	20.09	C	0.4	1
SB	TH-RT	0.68	0.29	100.0	23.85	497	2.58	1.00	26.42	D	6.7	8

DIR	Delay	LOS
EB	15.26	C
WB	59.16	E
NB	35.42	D
SB	26.05	D

INTERSECTION DELAY = 34.25 INTERSECTION LOS=D

THE CYCLE LENGTH WITHIN THE BOUNDS OF 100 TO 100 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 100.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 38.4 SECONDS
for chosen cycle length 100.0
suggested timing phase 1 is 28.2 secs green, 0.0 secs yellow + red clear
suggested timing phase 2 is 18.2 secs green, 0.0 secs yellow + red clear
suggested timing phase 3 is 14.5 secs green, 4.0 secs yellow + red clear
suggested timing phase 4 is 31.1 secs green, 4.0 secs yellow + red clear

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CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND HARRISON AVE
FUTURE 2000 NO-BUILD PM PEAK HOUR - OPTIMIZED TIMINGS
date:03-25-1991            time:10:00:06
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAHAN&PM   GEOMETRICS=MAHAN&PM   SIGNAL=MAHAN&PM
LOCATED IN CBD:N
VOLUME & GEOMETRICS
```

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	145	960	100	1	2	0	10.0	11.0	0.0	83
WB	190	840	90	1	2	0	11.0	11.0	0.0	63
NB	65	270	220	1	1	0	12.0	12.0	0.0	40
SB	50	260	120	1	1	0	12.0	12.0	0.0	40

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK			PEDESTRIANS				ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	3.0%	Y	0	4	.930	20	N	27.8	3
WB	0.0%	3.0%	Y	0	4	.930	20	N	27.8	3
NB	0.0%	3.0%	N	0	0	.930	20	N	17.0	3
SB	0.0%	3.0%	N	0	0	.930	20	N	17.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1	*	*	*														29.0	0	P
2		*	*			*	*										16.4	0	P
3					*	*	*										16.0	4	P
4									*	*	*		*	*	*		40.6	4	P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET

PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	145	960	100	.930	156	1032	108
WB	190	840	90	.930	204	903	97
NB	65	270	220	.930	70	290	237
SB	50	260	120	.930	54	280	129

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	156	1	1.00	156	1.00	0.00
EB	TH-RT	1140	2	1.05	1197	0.00	0.09
WB	LT	204	1	1.00	204	1.00	0.00
WB	TH-RT	1000	2	1.05	1050	0.00	0.10
NB	LT	70	1	1.00	70	1.00	0.00
NB	TH-RT	527	1	1.00	527	0.00	0.45
SB	LT	54	1	1.00	54	1.00	0.00
SB	TH-RT	409	1	1.00	409	0.00	0.32

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	204	903	97	0	0	0	1	2	0	0
WESTBOUND	156	1032	108	0	0	0	1	2	0	0
NORTHBOUND	54	280	129	100	100	100	1	1	0	409
SOUTHBOUND	70	290	237	100	100	100	1	1	0	527

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT	1800	1	0.933	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1572
EB	TH-RT	1800	2	0.967	0.985	1.000	1.000	0.992	1.000	0.986	1.000	3352
WB	LT	1800	1	0.967	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1629
WB	TH-RT	1800	2	0.967	0.985	1.000	1.000	0.992	1.000	0.985	1.000	3351
NB	LT	1800	1	1.000	0.985	1.000	1.000	1.000	1.000	1.000	0.373	661
NB	TH-RT	1800	1	1.000	0.985	1.000	1.000	1.000	1.000	0.933	1.000	1654
SB	LT	1800	1	1.000	0.985	1.000	1.000	1.000	1.000	1.000	0.240	426
SB	TH-RT	1800	1	1.000	0.985	1.000	1.000	1.000	1.000	0.953	1.000	1689

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vo	Vlt	Plt	No	Vo	Plto
NB	110	41	1	70	527	70	1.00	1	409	0.00
SB	110	41	1	54	409	54	1.00	1	527	0.00

CALCULATIONS

DIR	Sao	Yo	Bu	Fs	Pl	Bo	Pt	Bf	El	Fm	Flt
NB	1800	0.227	20.220	0.620	1.000	20.380	0.000	0.000	1.816	0.373	0.373
SB	1800	0.293	11.879	0.546	1.000	28.721	0.000	0.000	2.062	0.240	0.240

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	156	1572	0.10	0.26	415	0.38	
EB	TH-RT	1197	3352	0.36	0.41	1383	0.87	*
WB	LT	204	1629	0.13	0.15	237	0.86	*
WB	TH-RT	1050	3351	0.31	0.29	987	1.06	
NB	LT	70	661	0.11	0.37	244	0.29	
NB	TH-RT	527	1654	0.32	0.37	610	0.86	*
SB	LT	54	426	0.13	0.37	157	0.34	
SB	TH-RT	409	1689	0.24	0.37	624	0.66	

CYCLE=110.0 LOST= 8.0 SUM V/S CRIT= 0.80 TOTAL V/C= 0.86

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avq Q	95% Q
EB	LT	0.38	0.26	110.0	25.16	415	0.28	1.00	25.44	D	3.5	4
EB	TH-RT	0.87	0.41	110.0	22.42	1383	4.28	1.00	26.70	D	20.5	26
WB	LT	0.86	0.15	110.0	34.90	237	18.05	1.00	52.95	E	5.7	10
WB	TH-RT	1.06	0.29	110.0	30.30	987	41.12	1.00	71.42	F	30.6	60
NB	LT	0.29	0.37	110.0	18.61	244	0.19	1.00	18.79	C	1.3	2
NB	TH-RT	0.86	0.37	110.0	24.42	610	8.57	1.00	32.98	D	10.2	15
SB	LT	0.34	0.37	110.0	19.04	157	0.52	1.00	19.56	C	1.0	2
SB	TH-RT	0.66	0.37	110.0	21.95	624	1.75	1.00	23.70	C	7.9	9

DIR	Delay	LOS
EB	26.55	D
WB	68.41	F
NB	31.32	D
SB	23.22	C

INTERSECTION DELAY = 41.23 INTERSECTION LOS=E

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 51.0 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 29.0 secs green. 0.0 secs yellow + red clear
suggested timing phase 2 is 16.4 secs green. 0.0 secs yellow + red clear
suggested timing phase 3 is 16.0 secs green. 4.0 secs yellow + red clear
suggested timing phase 4 is 40.6 secs green. 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND HARRISON AVE
FUTURE BUILD PM PEAK
date:04-22-1991 time:11:11:20
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAHABPM GEOMETRICS=MAHABPM SIGNAL=MAHABPM
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	150	965	100	1	2	0	10.0	11.0	0.0	83
WB	190	885	90	1	2	0	11.0	11.0	0.0	83
NB	65	270	220	1	1	0	12.0	12.0	0.0	40
SB	50	260	120	1	1	0	12.0	12.0	0.0	40

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	3.0%	Y	0	4	.940	20	N	27.8	3
WB	0.0%	3.0%	Y	0	4	.940	20	N	27.8	3
NB	0.0%	3.0%	N	0	0	.940	20	N	17.0	3
SB	0.0%	3.0%	N	0	0	.940	20	N	17.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	I	t	r	o	I	t	r	o	l	t	r	o	l	t	r	o			
1	*	*	*														29.3	0	P
2		*	*			*	*										16.3	0	P
3					*	*	*										15.9	4	P
4									*	*	*		*	*	*		40.5	4	P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	150	965	100	.940	160	1027	106
WB	190	885	90	.940	202	941	96
NB	65	270	220	.940	69	287	234
SB	50	260	120	.940	53	277	128

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	PIt	Prt
EB	LT	160	1	1.00	160	1.00	0.00
EB	TH-RT	1133	2	1.05	1190	0.00	0.09
WB	LT	202	1	1.00	202	1.00	0.00
WB	TH-RT	1037	2	1.05	1089	0.00	0.09
NB	LT	69	1	1.00	69	1.00	0.00
NB	TH-RT	521	1	1.00	521	0.00	0.45
SB	LT	53	1	1.00	53	1.00	0.00
SB	TH-RT	404	1	1.00	404	0.00	0.32

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	202	941	96	0	0	0	1	2	0	0
WESTBOUND	160	1027	106	0	0	0	1	2	0	0
NORTHBOUND	53	277	128	100	100	100	1	1	0	404
SOUTHBOUND	69	287	234	100	100	100	1	1	0	521

ESTIMATION OF TH ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT	1800	1 0.933	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1572
EB	TH-RT	1800	2 0.927	0.985	1.000	1.000	0.992	1.000	0.985	1.000	3352
WB	LT	1800	1 0.967	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1629
WB	TH-RT	1800	2 0.957	0.985	1.000	1.000	0.992	1.000	0.986	1.000	3353
NB	LT	1800	1 1.000	0.985	1.000	1.000	1.000	1.000	1.000	0.377	665
NB	TH-RT	1800	1 1.000	0.985	1.000	1.000	1.000	1.000	0.933	1.000	1654
SB	LT	1800	1 1.000	0.985	1.000	1.000	1.000	1.000	1.000	0.245	435
SB	TH-RT	1800	1 1.000	0.985	1.000	1.000	1.000	1.000	0.952	1.000	1689

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	W	Va	Va	Vlt	Flt	Nc	Vo	Pito
NB	110	41	1	69	521	69	1.00	1	404	0.00
SB	110	41	1	53	404	53	1.00	1	521	0.00

CALCULATIONS

DIR	Sbo	Yo	Gu	Fs	Pl	Go	Pt	Gf	Ei	Fa	Flt
NB	1800	0.225	20.370	0.622	1.000	20.130	0.000	0.000	1.906	0.377	0.377
SB	1800	0.290	12.168	0.549	1.000	28.332	0.000	0.000	2.048	0.245	0.245

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	160	1572	0.10	0.27	419	0.38	
EB	TH-RT	1190	3352	0.35	0.41	1390	0.86	*
WB	LT	202	1629	0.12	0.14	235	0.86	*
WB	TH-RT	1089	3353	0.32	0.29	981	1.11	
NB	LT	69	665	0.10	0.37	246	0.28	
NB	TH-RT	521	1654	0.32	0.37	609	0.86	*
SB	LT	53	435	0.12	0.37	160	0.33	
SB	TH-RT	404	1689	0.24	0.37	622	0.65	

CYCLE=110.0 LOST= 8.0 SUM V/S CRIT= 0.79 TOTAL V/C= 0.95

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.38	0.27	110.0	25.04	419	0.29	1.00	25.33	D	3.6	4
EB	TH-RT	0.86	0.41	110.0	22.21	1390	3.92	1.00	26.13	D	20.3	26
WB	LT	0.86	0.14	110.0	34.92	235	17.67	1.00	52.59	E	5.6	10
WB	TH-RT	1.11	0.29	110.0	30.97	981	60.31	1.00	91.28	F	37.5	80
NB	LT	0.28	0.37	110.0	18.61	246	0.17	1.00	18.78	C	1.3	2
NB	TH-RT	0.86	0.37	110.0	24.37	609	8.10	1.00	32.47	D	10.1	15
SB	LT	0.33	0.37	110.0	19.01	160	0.46	1.00	19.47	C	1.0	1
SB	TH-RT	0.65	0.37	110.0	21.94	622	1.69	1.00	23.62	C	7.8	9

DIR	Delay	LOS
EB	26.04	D
WB	85.23	F
NB	30.87	D
SB	23.14	C

INTERSECTION DELAY = 47.17 INTERSECTION LOS=E

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 48.8 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 29.3 secs green. 0.0 secs yellow + red clear
suggested timing phase 2 is 16.3 secs green. 0.0 secs yellow + red clear
suggested timing phase 3 is 15.9 secs green. 4.0 secs yellow + red clear
suggested timing phase 4 is 40.5 secs green. 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND MASS AVE
EXISTING CONDITIONS AM PEAK HOUR
date:04-16-1991 time:09:03:06
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALMAEXAM GEOMETRICS=ALMAEXAM SIGNAL=ALMAEXAM
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	140	639	111	1	2	0	10.0	11.0	0.0	56
WB	74	1179	445	1	2	1	12.0	12.0	12.0	56
NB	102	432	36	0	2	0	0.0	12.0	0.0	48
SB	123	113	57	1	2	0	11.0	11.0	0.0	48

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	5.0%	Y	0	4	.970	20	Y	21.0	3
WB	0.0%	5.0%	N	0	4	.970	10	Y	21.0	3
NB	0.0%	5.0%	Y	0	0	.970	10	Y	19.0	3
SB	0.0%	5.0%	N	0	0	.970	20	Y	19.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1	*				*												23.0	0	P
2	*	*	*		*	*	*										51.0	4	P
3											*		*	*	*		15.0	0	P
4									*	*	*		*	*	*		23.0	4	P

CYCLE= 120.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	140	639	111	.970	144	659	114
WB	74	1179	445	.970	76	1215	459
NB	102	432	36	.970	105	445	37
SB	123	113	57	.970	127	116	59

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	144	1	1.00	144	1.00	0.00
EB	TH-RT	773	2	1.05	812	0.00	0.15
WB	LT	76	1	1.00	76	1.00	0.00
WB	TH	1215	2	1.05	1276	0.00	0.00
WB	RT	459	1	1.00	459	0.00	1.00
NB	LT-TH-RT	588	2	1.05	617	0.18	0.06
SB	LT	127	1	1.00	127	1.00	0.00
SB	TH-RT	175	2	1.05	184	0.00	0.34

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	76	1215	459	100	100	0	1	2	1	1215
WESTBOUND	144	659	114	100	100	100	1	2	0	773
NORTHBOUND	127	116	59	0	61	61	1	2	0	106
SOUTHBOUND	105	445	37	100	100	100	0	2	0	588

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fpr	Fpark	Fbus	Farea	Frt	Flt	s

EB	LT	1500	1	0.987	0.976	1.000	1.000	1.000	1.000	1.000	0.950	1125
EB	TH-RT	1500	2	0.987	0.976	1.000	1.000	0.992	1.000	0.978	1.000	2743
WB	LT	1500	1	1.000	0.976	1.000	1.000	1.000	1.000	1.000	0.950	1390
WB	Th	1800	2	1.000	0.976	1.000	1.000	1.000	1.000	1.000	1.000	3512
WB	RT	1500	1	1.000	0.976	1.000	1.000	0.983	1.000	0.850	1.000	1223
NB	LT-TH-RT	1700	2	1.000	0.976	1.000	1.000	1.000	1.000	0.991	0.976	3206
SB	LT	1300	1	0.987	0.976	1.000	1.000	1.000	1.000	1.000	0.950	1165
SB	TH-RT	1800	2	0.987	0.976	1.000	1.000	1.000	1.000	0.950	1.000	3224

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Plt	Nc	Vo	Plto
NB	120	23	2	585	588	105	0.18	2	106	0.00

CALCULATIONS

DIR	Soo	Yo	Gu	Fs	PI	Go	Pt	Gf	El	Fa	Flt
NB	3600	0.029	20.055	0.809	0.378	2.945	0.622	1.657	1.391	0.952	0.976

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	144	1125	0.10	0.19	271	0.53	*
EB	TH-RT	812	2743	0.30	0.43	1166	0.70	
WB	LT	76	1390	0.03	0.15	452	0.17	
WB	Th	1276	3512	0.36	0.43	1493	0.85	
WB	RT	459	1223	0.38	0.43	520	0.88	*
NB	LT-TH-RT	617	3206	0.19	0.19	615	1.00	*
SB	LT	127	1165	0.08	0.13	196	0.65	*
SB	TH-RT	184	3224	0.06	0.32	1021	0.18	

CYCLE=120.0 LOST= 8.0 SUM V/S CRIT= 0.75 TOTAL V/C= 0.80
FOR THE EASTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C
RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
39 LEFT TURNS ON THE CHANGE INTERVAL AND 16 ON THE PERMISSIVE PHASE
FOR THE WESTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C
RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
49 LEFT TURNS ON THE CHANGE INTERVAL AND 136 ON THE PERMISSIVE PHASE
FOR THE SOUTHBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C
RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
41 LEFT TURNS ON THE CHANGE INTERVAL AND 10 ON THE PERMISSIVE PHASE

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.53	0.62	120.0	9.98	271	1.59	1.00	11.57	B	3.9	4
EB	TH-RT	0.70	0.43	120.0	21.41	1166	1.29	1.00	22.70	C	14.8	16
WB	LT	0.17	0.62	120.0	7.48	452	0.02	1.00	7.50	B	2.1	2
WB	TH	0.85	0.43	120.0	23.68	1493	3.64	1.00	27.32	D	23.3	29
WB	RT	0.88	0.43	120.0	24.12	520	11.44	1.00	35.56	D	8.9	15
NB	LT-TH-RT	1.00	0.19	120.0	36.90	615	28.92	1.00	65.82	F	18.7	33
SB	LT	0.65	0.32	120.0	26.77	196	4.89	1.00	31.66	D	3.7	4
SB	TH-RT	0.18	0.32	120.0	22.58	1021	0.01	1.00	22.59	C	4.0	4

DIR	Delay	LOS
EB	21.02	C
WB	28.57	D
NB	65.82	F
SB	26.29	D

INTERSECTION DELAY = 32.65 INTERSECTION LOS=D

THE CYCLE LENGTH WITHIN THE BOUNDS OF 120 TO 120 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 120.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 38.1 SECONDS
for chosen cycle length 120.0
suggested timing phase 1 is 15.2 secs green. 0.0 secs yellow + red clear
suggested timing phase 2 is 55.0 secs green. 4.0 secs yellow + red clear
suggested timing phase 3 is 12.[illegible] secs green. 0.0 secs yellow + red clear
suggested timing phase 4 is 28.7 secs green. 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND MASS AVE
FUTURE 2000 NO-BUILD AM PEAK HOUR OPTIMIZED TIMINGS
date:04-16-1991 time:09:09:43
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALMANBAM GEOMETRICS=ALMANBAM SIGNAL=ALMANBAM
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	135	665	115	1	2	0	10.0	11.0	0.0	56
WB	80	1280	370	1	2	1	12.0	12.0	12.0	56
NB	105	450	45	0	2	0	0.0	12.0	0.0	48
SB	95	200	60	1	2	0	11.0	11.0	0.0	48

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	5.0%	Y	0	4	.970	20	Y	21.0	3
WB	0.0%	5.0%	N	0	4	.970	10	Y	21.0	3
NB	0.0%	5.0%	Y	0	0	.970	10	Y	19.0	3
SB	0.0%	5.0%	N	0	0	.970	20	Y	19.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	o	l	t	r	o	l	t	r	o	l	t	r	o			
1	*				*												8.5	0	P
2	*	*	*		*	*	*										62.0	4	P
3									*	*	*		*	*	*		31.3	4	P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	135	665	115	.970	139	686	119
WB	80	1280	370	.970	82	1320	381
NB	105	450	45	.970	108	464	46
SB	95	200	60	.970	98	206	62

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	139	1	1.00	139	1.00	0.00
EB	TH-RT	804	2	1.05	844	0.00	0.15
WB	LT	82	1	1.00	82	1.00	0.00
WB	TH	1320	2	1.05	1386	0.00	0.00
WB	RT	381	1	1.00	381	0.00	1.00
NB	LT-TH-RT	619	2	1.05	649	0.18	0.08
SB	LT	98	1	1.00	98	1.00	0.00
SB	TH-RT	268	2	1.05	281	0.00	0.23

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN BEING OPPOSED	OPPOSING APPROACH VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING VOLUME
	LT	TH	RT	LT	TH	RT	LT	TH	RT	
EASTBOUND	82	1320	381	100	100	0	1	2	1	1320
WESTBOUND	139	686	119	100	100	100	1	2	0	804
NORTHBOUND	98	206	62	100	100	100	1	2	0	268
SOUTHBOUND	108	464	46	100	100	100	0	2	0	619

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL N	Fwid	Fhv	For Fpark	Fpus Farea	Frt	Flt	s

EB	LT	1500	1	0.967	0.976	1.000	1.000	1.000	1.000	1.000	0.950	1125
EB	TH-RT	1500	2	0.967	0.976	1.000	1.000	0.993	1.000	0.976	1.000	2744
WB	LT	1500	1	1.000	0.976	1.000	1.000	1.000	1.000	1.000	0.950	1390
WB	TH	1900	2	1.000	0.976	1.000	1.000	1.000	1.000	1.000	1.000	3512
WB	RT	1500	1	1.000	0.976	1.000	1.000	1.000	1.000	0.983	1.000	1223
NB	LT-TH-RT	1700	2	1.000	0.976	1.000	1.000	1.000	1.000	0.989	0.901	2954
SB	LT	1300	1	0.967	0.976	1.000	1.000	1.000	1.000	1.000	0.300	376
SB	TH-RT	1600	2	0.967	0.976	1.000	1.000	1.000	1.000	0.955	1.000	3278

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Va	Vlt	Plt	No	Vo	Plto
NB	110	31	2	619	619	108	0.18	2	265	0.00
SB	110	31	1	98	268	95	1.00	2	619	0.18

CALCULATIONS

DIR	Soo	Yo	Gu	Fs	Fl	Go	Ft	Gf	El	Fm	Flt
NB	3600	0.074	24.932	0.707	0.422	6.334	0.578	2.256	1.550	0.601	0.901
SB	3263	0.190	12.849	0.488	1.000	16.417	0.000	0.000	2.303	0.306	0.306

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	139	1125	0.07	0.08	149	0.93	*
EB	TH-RT	844	2744	0.31	0.56	1546	0.55	
WB	LT	82	1390	0.02	0.08	376	0.22	
WB	TH	1386	3512	0.39	0.56	1979	0.70	*
WB	RT	381	1223	0.31	0.56	689	0.55	
NB	LT-TH-RT	649	2954	0.22	0.28	840	0.77	
SB	LT	98	376	0.26	0.28	107	0.92	*
SB	TH-RT	281	3278	0.09	0.28	932	0.30	

CYCLE=110.0 LOST= 6.0 SUM V/S CRIT= 0.73 TOTAL V/C= 0.79

FOR THE EASTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR

43 LEFT TURNS ON THE CHANGE INTERVAL AND 16 ON THE PERMISSIVE PHASE

FOR THE WESTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR

53 LEFT TURNS ON THE CHANGE INTERVAL AND 212 ON THE PERMISSIVE PHASE

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.93	0.64	110.0	13.32	149	38.73	1.00	52.05	E	4.0	7
EB	TH-RT	0.55	0.56	110.0	11.51	1546	0.32	1.00	11.83	B	10.7	11
WB	LT	0.22	0.64	110.0	6.20	376	0.05	1.00	6.25	B	2.3	2
WB	TH	0.70	0.56	110.0	13.16	1979	0.79	1.00	13.95	B	17.6	18
WB	RT	0.55	0.56	110.0	11.58	689	0.75	1.00	12.33	B	5.1	5
NB	LT-TH-RT	0.77	0.28	110.0	27.45	840	3.16	1.00	30.61	D	13.5	17
SB	LT	0.92	0.28	110.0	28.97	107	43.29	1.00	72.26	F	3.0	7
SB	TH-RT	0.30	0.28	110.0	23.43	932	0.06	1.00	23.49	C	5.9	6

DIR	Delay	LOS
EB	17.52	C
WB	13.27	B
NB	30.61	D
SB	36.08	D

INTERSECTION DELAY = 19.51 INTERSECTION LOS=C

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 34.5 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 10.4 secs green. 0.0 secs yellow + red clear
suggested timing phase 2 is 55.1 secs green. 4.0 secs yellow + red clear
suggested timing phase 3 is 36.5 secs green. 4.0 secs yellow + red clear

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CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND MASS AVE
FUTURE BUILD [redacted] AM PEAK HOUR
date:04-16-1991              time:09:20:12
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALMAS[redacted]AM   GEOMETRICS=ALMAS[redacted]M   SIGNAL=ALMAS[redacted]AM
LOCATED IN CBD:N
VOLUME & GEOMETRICS
        VOLUMES        # OF LANES      LANE WIDTH      CROSS
DIR  LT   TH   RT     LT TH RT       LT   TH   RT      WALK
EB  170  665  115     1  2  0      10.0 11.0  0.0      56
WB   80 1280  640     1  2  1      12.0 12.0 12.0      56
NB  105  45   45      0  2  0       0.0 12.0  0.0      45
SB  120  200  65      1  2  0      11.0 11.0  0.0      45

TRAFFIC & ROADWAY CONDITIONS
                 ADJ PARK                PEDESTRIANS        ARR
DIR GRADE S-V   Y/N MOVES BUSES  PHF CROSS BUT MIN TIME TYPE
EB  0.0%  5.0%   Y     0    4   .970  20   Y    21.0    3
WB  0.0%  5.0%   N     0    4   .970  10   Y    21.0    3
NB  0.0%  5.0%   Y     0    0   .970  10   Y    15.0    3
SB  0.0%  5.0%   N     0    0   .970  20   Y    15.0    3

PHASINGS
   EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  Y+R PRE/ACT
   l  t  r  p  l  t  r  p  l  t  r  p  l  t  r  p
 1 :           :                                       11.0   0    P
 2 :  :  :     :  :  :                                 60.6   4    P
 3                          :  :  :     :  :  :        30.4   4    P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTPR THPR RTPR
EB   170  665  115  .970   175  685  119
WB    80 1280  640  .970    82 1320  660
NB   105  45   45  .970   108  47   46
SB   120  200  65  .970   124  206  67

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Plt  Prt
EB  LT         175 1 1.00  175 1.00 0.00
EB  TH-RT      804 2 1.05  844 0.00 0.15
WB  LT          82 1 1.00   82 1.00 0.00
WB  TH        1320 2 1.05 1386 0.00 0.00
WB  RT         660 1 1.00  660 0.00 1.00
NB  LT-TH-RT   634 2 1.05  666 0.17 0.07
SB  LT         124 1 1.00  124 1.00 0.00
SB  TH-RT      273 2 1.05  287 0.00 0.25

PART 3 (OPPOSING VOLUME ADJUSTMENTS)
LEFT TURN                OPPOSING APPROACH
BEING OPPOSED        VOLUMES       % OPPOSING LEFT TURN    # LANES     OPPOSING
                 LT   TH   RT        LT   TH   RT        LT  TH  RT    VOLUME
EASTBOUND        82 1320  660       100  100   0         1   2   1     1320
WESTBOUND       175  685  119       100  100 100         1   2   0      804
NORTH-BOUND     124  206   67       100  100 100         1   2   0      273
SOUTH-BOUND     108  47   46        100  100 100         0   2   0      634

SATURATION FLOW ADJUSTMENT WORKSHEET
DIR LN GROUP  IDEAL N  Fwid   Fhv   Fgr Fpbt  Fbus Fpres   Frt   Flt    s
```

EB	LT	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EB	TH-RT	1500	2	0.957	0.97c	1.000	1.000	0.992	1.000	0.978	1.000	[illegible]	[illegible]	[illegible]
WB	LT	1500	1	1.000	0.97c	1.000	1.000	1.000	1.000	1.000	0.951	1379		
WB	TH	1500	2	1.000	0.97c	1.000	1.000	1.000	1.000	1.000	1.000	3512		
WB	RT	1500	1	1.000	0.97c	1.000	1.000	0.982	1.000	0.850	1.000	1223		
NB	LT-TH-RT	1700	2	1.000	0.975	1.000	1.000	1.000	1.000	0.929	0.899	2951		
SB	LT	1500	1	0.957	0.97c	1.000	1.000	1.000	1.000	1.000	0.288	354		
SB	TH-RT	1800	2	0.957	0.97c	1.000	1.000	1.000	1.000	0.965	1.000	3270		

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR PLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Plt	No	Vc	Pltc
NB	110	30	2	634	634	108	0.17	2	273	0.00
SB	110	30	1	124	270	124	1.00	2	604	0.17

CALCULATIONS

DIR	Scc	Yo	Go	Fs	Fl	Go	Ft	Gf	El	Fm	Flt
NB	3600	0.076	20.922	0.704	0.414	6.540	0.586	2.335	1.597	0.799	-0.899
SB	3267	0.194	11.120	0.479	1.000	19.179	0.000	0.000	2.350	0.288	0.288

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	178	1128	0.10	0.10	171	1.02	*
EB	TH-RT	644	2744	0.31	0.55	1512	0.56	
WB	LT	82	1370	0.02	0.10	397	0.21	
WB	TH	1356	3512	0.39	0.55	1936	0.72	
WB	RT	660	1223	0.54	0.55	674	0.98	*
NB	LT-TH-RT	666	2951	0.23	0.28	815	0.82	
SB	LT	124	354	0.35	0.28	98	1.27	*
SB	TH-RT	287	3270	0.09	0.28	903	0.32	

CYCLE=110.0 LOST= 8.0 SUM V/S CRIT= 0.99 TOTAL V/C= 1.07
FOR THE EASTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C
RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
43 LEFT TURNS ON THE CHANGE INTERVAL AND 15 ON THE PERMISSIVE PHASE
FOR THE WESTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C
RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
53 LEFT TURNS ON THE CHANGE INTERVAL AND 204 ON THE PERMISSIVE PHASE

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	1.02	0.65	110.0	15.27	171	60.77	1.00	76.04	F	6.1	12
EB	TH-RT	0.56	0.55	110.0	12.17	1512	0.36	1.00	12.53	B	11.0	11
WB	LT	0.21	0.65	110.0	5.85	397	0.04	1.00	5.92	B	2.3	2
WB	TH	0.72	0.55	110.0	13.91	1936	0.91	1.00	14.82	B	18.1	18
WB	RT	0.98	0.55	110.0	18.29	674	21.99	1.00	40.28	E	11.9	23
NB	LT-TH-RT	0.82	0.28	110.0	28.29	815	4.58	1.00	32.87	D	14.0	19
SB	LT	1.27	0.28	110.0	32.70	98	221.02	1.00	254.71	F	10.1	27
SB	TH-RT	0.32	0.28	110.0	24.02	903	0.07	1.00	24.09	C	6.0	6

DIR	Delay	LOS
EB	23.44	C
WB	22.37	C
NB	32.87	D
SB	93.56	F

INTERSECTION DELAY = 31.21 INTERSECTION LOS=D

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 0 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

THE V/C RATIO CAN'T BE .95 FOR THE GIVEN CONDITIONS
for chosen cycle length 110.0
suggested timing phase 1 is 10.6 secs green. 0.0 secs yellow + red clear
suggested timing phase 2 is 55.5 secs green. 4.0 secs yellow + red clear
suggested timing phase 3 is 30.0 secs green. 4.0 secs yellow + red clear

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CINCH PROGRAM VERSION DATE 4-29-1986
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND MASS AVE
FUTURE BUILD MITIGATED AM PEAK HOUR
date:04-23-1991                time:08:17:57
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALMABMAM   GEOMETRICS=ALMABMAM   SIGNAL=ALMABMAM
LOCATED IN CBD:N
VOLUME & GEOMETRICS
        VOLUMES        # OF LANES      LANE WIDTH      CROSS
DIR  LT   TH   RT     LT TH RT       LT   TH   RT     WALK
EB  160  665  115      1  2  0      10.0 11.0  0.0     56
WB   80 1280  230      1  2  1      12.0 12.0 12.0     56
NB  105  460   45      0  2  0       0.0 12.0  0.0     48
SB   95  200   65      1  2  0      11.0 11.0  0.0     48

TRAFFIC & ROADWAY CONDITIONS
                  ADJ PARK                PEDESTRIANS        ARR
DIR GRADE %HV   Y/N MOVES BUSES  PHF CROSS BUT MIN TIME TYPE
EB  0.0%  5.0%   Y     0     4   .970   20   Y    21.0    3
WB  0.0%  5.0%   N     0     4   .970   10   Y    21.0    3
NB  0.0%  5.0%   Y     0     0   .970   10   Y    19.0    3
SB  0.0%  5.0%   N     0     0   .970   20   Y    19.0    3

PHASINGS
    EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  Y+R PRE/ACT
    l  t  r  p  l  t  r  p  l  t  r  p  l  t  r  p
 1  *           *                                  10.5   0    P
 2  *  *  *     *  *  *                            60.4   4    P
 3                          *  *  *     *  *  *    31.0   4    P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTFR THFR RTFR
EB   160  665  115  .970   165  686  119
WB    80 1280  230  .970    82 1320  237
NB   105  460   45  .970   108  474   46
SB    95  200   65  .970    98  206   67

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Plt  Prt
EB  LT         165 1 1.00  165 1.00 0.00
EB  TH-RT      804 2 1.05  844 0.00 0.15
WB  LT          82 1 1.00   82 1.00 0.00
WB  TH        1320 2 1.05 1386 0.00 0.00
WB  RT         237 1 1.00  237 0.00 1.00
NB  LT-TH-RT   629 2 1.05  660 0.17 0.07
SB  LT          98 1 1.00   98 1.00 0.00
SB  TH-RT      273 2 1.05  287 0.00 0.25

PART 3 (OPPOSING VOLUME ADJUSTMENTS)
LEFT TURN                 OPPOSING APPROACH
BEING OPPOSED       VOLUMES      % OPPOSING LEFT TURN    # LANES     OPPOSING
                  LT   TH   RT       LT   TH   RT       LT  TH  RT    VOLUME
EASTBOUND         82 1320  237      100  100    0        1   2   1    1320
WESTBOUND        165  686  119      100  100  100        1   2   0     804
NORTHBOUND        98  206   67      100  100  100        1   2   0     273
SOUTHBOUND       108  474   46      100  100  100        0   2   0     629

SATURATION FLOW ADJUSTMENT WORKSHEET
DIR LN GROUP  IDEAL N  Fwid   Fhv   Fpr Fpark  Fcus Fares   Frt   Flt    s
EB  LT         [illegible]
```

EB	TH-RT	1500	2	0.967	0.97c	1.000	1.000	0.49[illegible]	1.000	0.972	1.000	1.44			
WB	LT	1500	1	1.000	0.97c	1.000	1.000	1.000	1.000	1.000	0.959	1[illegible]			
WB	TH	1500	2	1.000	0.97c	1.000	1.000	1.000	1.000	1.000	1.000	3512			
WB	RT	1500	1	1.000	0.97c	1.000	1.000	0.983	1.000	0.259	1.000	1222			
NB	LT-TH-RT	1700	2	1.000	0.97c	1.000	1.000	1.000	1.000	0.989	0.859	2951			
SB	LT	1300	1	0.967	0.97c	1.000	1.000	1.000	1.000	1.000	0.297	364			
SB	TH-RT	1800	2	0.967	0.97c	1.000	1.000	1.000	1.000	0.983	1.000	3270			

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT
INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Flt	Nc	Vo	Flto
NB	110	31	2	629	629	108	0.17	2	273	0.00
SB	110	31	1	98	273	98	1.00	2	629	0.17

CALCULATIONS

DIR	Sbo	to	Go	Fs	Fl	Go	Pt	Gf	El	Fo	Flt
NB	3600	0.076	24.544	0.704	0.417	6.485	0.587	2.308	1.597	0.799	0.699
SB	3264	0.193	12.185	0.482	1.000	18.844	0.000	0.000	2.334	0.297	0.297

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	165	1125	0.10	0.16	166	0.99	*
EB	TH-RT	844	2744	0.31	0.55	1507	0.56	
WB	LT	82	1390	0.02	0.16	390	0.21	
WB	TH	1386	3512	0.39	0.55	1930	0.72	*
WB	RT	237	1223	0.19	0.55	672	0.35	
NB	LT-TH-RT	660	2951	0.22	0.28	832	0.79	
SB	LT	98	364	0.27	0.28	103	0.95	*
SB	TH-RT	287	3270	0.09	0.28	922	0.31	

CYCLE=110.0 LOST= 8.0 SUM V/S CRIT= 0.76 TOTAL V/C= 0.82
FOR THE EASTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C
RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
43 LEFT TURNS ON THE CHANGE INTERVAL AND 15 ON THE PERMISSIVE PHASE
FOR THE WESTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C
RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
53 LEFT TURNS ON THE CHANGE INTERVAL AND 203 ON THE PERMISSIVE PHASE

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.99	0.65	110.0	14.66	166	51.82	1.00	66.49	F	5.3	10
EB	TH-RT	0.56	0.55	110.0	12.26	1507	0.36	1.00	12.62	B	11.1	11
WB	LT	0.21	0.65	110.0	6.09	390	0.04	1.00	6.14	B	2.3	2
WB	TH	0.72	0.55	110.0	14.01	1930	0.92	1.00	14.94	B	16.2	18
WB	RT	0.35	0.55	110.0	10.53	672	0.14	1.00	10.66	B	3.3	3
NB	LT-TH-RT	0.79	0.28	110.0	27.76	832	3.71	1.00	31.47	D	13.8	17
SB	LT	0.95	0.28	110.0	29.47	103	53.60	1.00	83.06	F	3.3	8
SB	TH-RT	0.31	0.28	110.0	23.62	922	0.07	1.00	23.68	C	6.0	6

DIR	Delay	LOS
EB	21.42	C
WB	13.92	B
NB	31.47	D
SB	38.79	D

INTERSECTION DELAY = 21.56 INTERSECTION LOS=C

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 39.7 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 12.8 secs green. 0.0 secs yellow + red clear
suggested timing phase 2 is 53.1 secs green. 4.0 secs yellow + red clear
suggested timing phase 3 is 36.2 secs green. 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND MASS AVE
EXISTING CONDITIONS PM PEAK HOUR
date:04-16-1991 time:09:43:02
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALMAEXPM GEOMETRICS=ALMAEXPM SIGNAL=ALMAEXPM
LOCATED IN CBD:N

VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	50	1010	158	1	2	0	10.0	11.0	0.0	56
WB	37	864	99	1	2	1	12.0	12.0	12.0	56
NB	103	265	99	0	2	0	0.0	12.0	0.0	48
SB	170	266	83	1	2	0	11.0	11.0	0.0	48

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	3.0%	Y	0	4	.940	20	Y	21.0	3
WB	0.0%	3.0%	N	0	4	.940	10	Y	21.0	3
NB	0.0%	3.0%	Y	0	0	.940	10	Y	19.0	3
SB	0.0%	3.0%	N	0	0	.940	20	Y	19.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1	*				*												20.0	0	P
2	*	*	*		*	*	*										51.0	4	P
3													*	*	*		15.0	0	P
4									*	*	*		*	*	*		25.0	4	P

CYCLE= 120.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	50	1010	158	.940	53	1074	168
WB	37	864	99	.940	39	919	105
NB	103	265	99	.940	110	282	105
SB	170	266	83	.940	181	283	88

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	53	1	1.00	53	1.00	0.00
EB	TH-RT	1243	2	1.05	1305	0.00	0.14
WB	LT	39	1	1.00	39	1.00	0.00
WB	TH	919	2	1.05	965	0.00	0.00
WB	RT	105	1	1.00	105	0.00	1.00
NB	LT-TH-RT	497	2	1.05	522	0.22	0.21
SB	LT	181	1	1.00	181	1.00	0.00
SB	TH-RT	371	2	1.05	390	0.00	0.24

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	39	919	105	100	100	0	1	2	1	919
WESTBOUND	53	1074	168	100	100	100	1	2	0	1243
NORTHBOUND	181	283	88	0	63	63	1	2	0	235
SOUTHBOUND	110	282	105	100	100	100	0	2	0	497

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	ISEAL	N	Fa1a	Fv	Fcr	Fbem	Fbus	Farea	Frt	Flt	E
EB	LT	1300	1	0.937	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1136
EB	TH-RT	1500	2	0.967	0.985	1.000	1.000	0.992	1.000	0.980	1.000	2775
WB	LT	1500	1	1.000	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1404
WB	TH	1800	2	1.000	0.985	1.000	1.000	1.000	1.000	1.000	1.000	3547
WB	RT	1500	1	1.000	0.955	1.000	1.000	0.923	1.000	0.850	1.000	1235
NB	LT-TH-RT	1700	2	1.000	0.985	1.000	1.000	1.000	1.000	0.963	0.850	2855
SB	LT	1300	1	0.967	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1176
SB	TH-RT	1800	2	0.967	0.985	1.000	1.000	1.000	1.000	0.964	1.000	3306

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Flt	Nb	Vc	Fltc
NB	120	26	2	457	497	110	0.22	2	235	0.00

CALCULATIONS

DIR	Sco	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fm	Flt
NB	3600	0.065	19.422	0.726	0.528	6.576	0.472	1.635	1.546	0.760	0.850

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	53	1136	0.03	0.17	302	0.18	*
EB	TH-RT	1305	2776	0.47	0.43	1180	1.11	*
WB	LT	39	1404	0.02	0.17	299	0.13	
WB	TH	965	3547	0.27	0.43	1507	0.64	
WB	RT	105	1235	0.09	0.43	525	0.20	
NB	LT-TH-RT	522	2855	0.18	0.22	618	0.84	*
SB	LT	181	1176	0.10	0.13	230	0.79	*
SB	TH-RT	390	3306	0.12	0.34	1130	0.35	

CYCLE=120.0 LOST= 8.0 SUM V/S CRIT= 0.78 TOTAL V/C= 0.84

FOR THE EASTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
40 LEFT TURNS ON THE CHANGE INTERVAL AND 73 ON THE PERMISSIVE PHASE

FOR THE WESTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
49 LEFT TURNS ON THE CHANGE INTERVAL AND 16 ON THE PERMISSIVE PHASE

FOR THE SOUTHBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
41 LEFT TURNS ON THE CHANGE INTERVAL AND 41 ON THE PERMISSIVE PHASE

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.18	0.59	120.0	8.49	302	0.03	1.00	6.52	B	1.5	1
EB	TH-RT	1.11	0.43	120.0	26.45	1180	56.67	1.00	85.12	F	41.3	89
WB	LT	0.13	0.59	120.0	6.25	299	0.01	1.00	8.26	B	1.1	1
WB	TH	0.64	0.43	120.0	20.71	1507	0.66	1.00	21.37	C	17.6	18
WB	RT	0.20	0.43	120.0	16.48	525	0.03	1.00	16.51	C	2.0	2
NB	LT-TH-RT	0.84	0.22	120.0	34.24	618	7.22	1.00	41.46	E	13.0	18
SB	LT	0.79	0.34	120.0	27.04	230	11.14	1.00	38.18	D	5.3	7
SB	TH-RT	0.35	0.34	120.0	22.40	1130	0.08	1.00	22.48	C	8.1	8

DIR	Delay	LOS
EB	82.11	F
WB	20.45	C
NB	41.46	E
SB	27.46	D

INTERSECTION DELAY = 48.17 INTERSECTION LOS=E

THE CYCLE LENGTH WITHIN THE BOUNDS OF 120 TO 120 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 120.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 44.9 SECONDS
for chosen cycle length 120.0
suggested timing phase 1 is 4.2 secs green. 0.0 secs yellow + red clear
suggested timing phase 2 is 67.4 secs green. 4.0 secs yellow + red clear
suggested timing phase 3 is 14.1 secs green. 9.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-19-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND MASS AVE
FUTURE 2000 NO-BUILD PM PEAK HOUR - EXISTING TIMINGS
date:04-16-1991 time:09:54:33
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALMANPM GEOMETRICS=ALMANPM SIGNAL=ALMANPM
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	50	1015	165	1	2	0	10.0	11.0	0.0	56
WB	40	930	95	1	2	1	12.0	12.0	12.0	56
NB	115	280	110	0	2	0	0.0	12.0	0.0	48
SB	170	275	85	1	2	0	11.0	11.0	0.0	48

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK			PEDESTRIANS				ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	3.0%	Y	0	4	.940	20	Y	21.0	3
WB	0.0%	3.0%	N	0	4	.940	10	Y	21.0	3
NB	0.0%	3.0%	Y	0	0	.940	10	Y	19.0	3
SB	0.0%	3.0%	N	0	0	.940	20	Y	19.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1	*				*												20.0	0	P
2	*	*	*		*	*	*										51.0	4	P
3													*	*	*	*	15.0	0	P
4									*	*	*		*	*	*	*	26.0	4	P

CYCLE= 120.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	50	1015	165	.940	53	1080	176
WB	40	930	95	.940	43	989	101
NB	115	280	110	.940	122	298	117
SB	170	275	85	.940	181	293	90

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Pit	Prt
EB	LT	53	1	1.00	53	1.00	0.00
EB	TH-RT	1255	2	1.05	1318	0.00	0.14
WB	LT	43	1	1.00	43	1.00	0.00
WB	TH	989	2	1.05	1039	0.00	0.00
WB	RT	101	1	1.00	101	0.00	1.00
NB	LT-TH-RT	537	2	1.05	564	0.23	0.22
SB	LT	181	1	1.00	181	1.00	0.00
SB	TH-RT	383	2	1.05	402	0.00	0.24

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	43	989	101	100	100	0	1	2	1	989
WESTBOUND	53	1080	176	100	100	100	1	2	0	1255
NORTHBOUND	181	293	90	0	63	63	1	2	0	243
SOUTHBOUND	122	298	117	100	100	100	0	2	0	537

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	LOBEL	N	F-12	FF	FOF	FBFT	FOUS	FARBE	FCT	F.T	S
EB	LT	1700	1	0.922	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1136
EB	TH-RT	1500	2	0.967	0.985	1.000	1.000	0.992	1.000	0.979	1.000	2774
WB	LT	1500	1	1.000	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1404
WB	TH	1800	2	1.000	0.985	1.000	1.000	1.000	1.000	1.000	1.000	3547
WB	RT	1500	1	1.000	0.985	1.000	1.000	0.953	1.000	0.950	1.000	1235
NB	LT-TH-RT	1700	2	1.000	0.985	1.000	1.000	1.000	1.000	0.967	0.572	2825
SB	LT	1300	1	0.967	0.985	1.000	1.000	1.000	1.000	1.000	0.950	1176
SB	TH-RT	1800	2	0.967	0.955	1.000	1.000	1.000	1.000	0.965	1.000	3307

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Plt	No	Vo	Plto
NB	120	26	2	537	537	122	0.23	2	243	0.00

CALCULATIONS

DIR	Soo	Yo	Bu	Fs	P1	Bo	Pt	Bf	E1	Fa	Flt
NB	3600	0.067	19.200	0.723	0.550	6.800	0.450	1.529	1.556	0.744	0.872

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	p/C	c	v/c	CRITICAL
EB	LT	53	1136	0.03	0.17	286	0.19	*
EB	TH-RT	1316	2774	0.48	0.43	1179	1.12	*
WB	LT	43	1404	0.02	0.17	297	0.14	
WB	Th	1039	3547	0.29	0.43	1507	0.69	
WB	RT	101	1235	0.08	0.43	525	0.19	
NB	LT-TH-RT	564	2825	0.20	0.22	612	0.92	*
SB	LT	181	1176	0.10	0.13	218	0.83	*
SB	TH-RT	402	3307	0.12	0.34	1130	0.36	

CYCLE=120.0 LOST= 8.0 SUM V/S CRIT= 0.81 TOTAL V/C= 0.87
FOR THE EASTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C
RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
40 LEFT TURNS ON THE CHANGE INTERVAL AND 56 ON THE PERMISSIVE PHASE
FOR THE WESTBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C
RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
49 LEFT TURNS ON THE CHANGE INTERVAL AND 14 ON THE PERMISSIVE PHASE
FOR THE SOUTHBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C
RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR
41 LEFT TURNS ON THE CHANGE INTERVAL AND 30 ON THE PERMISSIVE PHASE

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	p/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.19	0.59	120.0	8.54	286	0.04	1.00	8.58	B	1.5	1
EB	TH-RT	1.12	0.43	120.0	28.73	1179	62.43	1.00	91.15	F	43.8	96
WB	LT	0.14	0.59	120.0	8.31	297	0.02	1.00	8.32	B	1.2	1
WB	TH	0.69	0.43	120.0	21.32	1507	0.95	1.00	22.27	C	19.0	19
WB	RT	0.19	0.43	120.0	16.42	525	0.02	1.00	16.44	C	1.9	2
NB	LT-TH-RT	0.92	0.22	120.0	34.96	612	14.03	1.00	48.99	E	14.3	23
SB	LT	0.83	0.34	120.0	27.58	218	15.42	1.00	43.00	E	5.3	7
SB	TH-RT	0.36	0.34	120.0	22.50	1130	0.09	1.00	22.58	C	8.4	8

DIR	Delay	LOS
EB	87.95	F
WB	21.27	C
NB	48.99	E
SB	28.92	D

INTERSECTION DELAY = 51.41 INTERSECTION LOS=E

THE CYCLE LENGTH WITHIN THE BOUNDS OF 120 TO 120 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 120.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 54.1 SECONDS
for chosen cycle length 120.0
suggested timing phase 1 is 4.3 secs green, 0.0 secs yellow + red clear
suggested timing phase 2 is 65.7 secs green, 4.0 secs yellow + red clear
suggested timing phase 3 is 14.3 secs green, 0.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND MASS AVE
FUTURE BUILD [redacted] PM PEAK HOUR
date:04-16-1991 time:09:57:52
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALMABF[redacted]M GEOMETRICS=ALMABF[redacted]M SIGNAL=ALMABF[redacted]M
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	55	1015	165	1	2	0	10.0	11.0	0.0	56
WB	40	930	155	1	2	1	12.0	12.0	12.0	56
NB	115	285	110	0	2	0	0.0	12.0	0.0	48
SB	320	290	130	1	2	0	11.0	11.0	0.0	48

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	3.0%	Y	0	4	.940	20	Y	21.0	3
WB	0.0%	3.0%	N	0	4	.940	10	Y	21.0	3
NB	0.0%	3.0%	Y	0	0	.940	10	Y	19.0	3
SB	0.0%	3.0%	N	0	0	.940	20	Y	19.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1	*	*	*		*	*	*										63.0	4	P
2											*		*	*	*		6.9	0	P
3									*	*	*		*	*	*		32.1	4	P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	55	1015	165	.940	59	1080	176
WB	40	930	155	.940	43	989	165
NB	115	285	110	.940	122	303	117
SB	320	290	130	.940	340	309	138

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	59	1	1.00	59	1.00	0.00
EB	TH-RT	1255	2	1.05	1318	0.00	0.14
WB	LT	43	1	1.00	43	1.00	0.00
WB	TH	989	2	1.05	1039	0.00	0.00
WB	RT	165	1	1.00	165	0.00	1.00
NB	LT-TH-RT	543	2	1.05	570	0.23	0.22
SB	LT	340	1	1.00	340	1.00	0.00
SB	TH-RT	447	2	1.05	469	0.00	0.31

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN BEING OPPOSED	OPPOSING APPROACH VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	43	989	165	100	100	0	1	2	1	989
WESTBOUND	59	1080	176	100	100	100	1	2	0	1255
NORTHBOUND	340	309	138	0	82	82	1	2	0	368
SOUTHBOUND	122	303	117	100	100	100	0	2	0	543

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fpr	Fpark	Fbus	Farea	Frt	Flt	s

EB	LT	1500	1	0.955	0.985	1.000	1.000	1.000	1.000	1.000	0.127	[illegible]	[illegible]
EB	TH-RT	1500	2	0.967	0.985	1.000	1.000	0.992	1.000	0.999	1.000	2774	
WB	LT	1500	1	1.000	0.985	1.000	1.000	1.000	1.000	1.000	0.112	165	
WB	TH	1500	2	1.000	0.985	1.000	1.000	1.000	1.000	1.000	1.000	3547	
WB	RT	1500	1	1.000	0.985	1.000	1.000	0.953	1.000	0.850	1.000	1235	
NB	LT-TH-RT	1700	2	1.000	0.985	1.000	1.000	1.000	1.000	0.968	0.821	2661	
SB	LT	1300	1	0.967	0.955	1.000	1.000	1.000	1.000	1.000	0.950	1176	
SB	TH-RT	1500	2	0.967	0.985	1.000	1.000	1.000	1.000	0.954	1.000	3269	

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	VIt	PIt	No	Vo	PIto
EB	110	63	1	59	1255	59	1.00	2	989	0.00
WB	110	63	1	43	1154	43	1.00	2	1255	0.00
NB	110	32	2	543	543	122	0.23	2	368	0.00

CALCULATIONS

DIR	Sog	Yo	Gu	Fs	Pl	Go	Pt	Gf	El	Fm	Flt
EB	3600	0.275	45.176	0.257	1.000	17.815	0.000	0.000	4.383	0.227	0.227
WB	3600	0.349	37.823	0.090	1.000	25.165	0.000	0.000	12.441	0.112	0.112
NB	3600	0.102	23.258	0.645	0.597	8.866	0.403	1.327	1.744	0.642	0.821

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	59	271	0.22	0.57	155	0.38	
EB	TH-RT	1318	2774	0.48	0.57	1558	0.83	*
WB	LT	43	165	0.26	0.57	95	0.45	
WB	TH	1039	3547	0.29	0.57	2031	0.51	
WB	RT	165	1235	0.13	0.57	707	0.23	
NB	LT-TH-RT	570	2661	0.21	0.29	777	0.73	*
SB	LT	340	1176	0.11	0.06	199	1.71	*
SB	TH-RT	469	3269	0.14	0.35	1159	0.40	

CYCLE=110.0 LOST= 8.0 SUM V/S CRIT= 0.80 TOTAL V/C= 0.86

FOR THE SOUTHBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR 45 LEFT TURNS ON THE CHANGE INTERVAL AND 80 ON THE PERMISSIVE PHASE

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.38	0.57	110.0	9.73	155	0.74	1.00	10.47	B	0.8	1
EB	TH-RT	0.83	0.57	110.0	14.55	1558	2.74	1.00	17.29	C	16.4	19
WB	LT	0.45	0.57	110.0	10.28	95	2.29	1.00	12.57	B	0.6	1
WB	TH	0.51	0.57	110.0	10.80	2031	0.19	1.00	10.98	B	12.9	13
WB	RT	0.23	0.57	110.0	8.81	707	0.03	1.00	8.84	B	2.2	2
NB	LT-TH-RT	0.73	0.29	110.0	26.66	777	2.50	1.00	29.16	D	11.7	14
SB	LT	1.71	0.35	110.0	44.38	199	771.21	1.00	815.59	F	82.0	232
SB	TH-RT	0.40	0.35	110.0	20.33	1159	0.13	1.00	20.46	C	8.8	9

DIR	Delay	LOS
EB	17.00	C
WB	10.75	B
NB	29.16	D
SB	354.81	F

INTERSECTION DELAY = 65.12 INTERSECTION LOS=F

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 49.5 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 60.9 secs green. 4.0 secs yellow + red clear
suggested timing phase 2 is 13.7 secs green. 0.0 secs yellow + red clear
suggested timing phase 3 is 27.4 secs green. 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
ALBANY ST AND MASS AVE
FUTURE BUILD MITIGATED PM PEAK HOUR
date:04-23-1991 time:08:20:54
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=ALMABMPM GEOMETRICS=ALMABMPM SIGNAL=ALMABMPM
LOCATED IN CBD:N
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	55	1015	165	1	2	0	10.0	11.0	0.0	56
WB	40	930	100	1	2	1	12.0	12.0	12.0	56
NB	115	280	110	0	2	0	0.0	12.0	0.0	48
SB	115	280	130	1	2	0	11.0	11.0	0.0	48

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK				PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	3.0%	Y	0	4	.940	20	Y	21.0	3
WB	0.0%	3.0%	N	0	4	.940	10	Y	21.0	3
NB	0.0%	3.0%	Y	0	0	.940	10	Y	19.0	3
SB	0.0%	3.0%	N	0	0	.940	20	Y	19.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1	*	*	*		*	*	*										63.4	4	P
2											*		*	*	*		6.6	0	P
3									*	*	*		*	*	*		32.0	4	P

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	55	1015	165	.940	59	1080	176
WB	40	930	100	.940	43	989	106
NB	115	280	110	.940	122	298	117
SB	115	280	130	.940	122	298	138

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	59	1	1.00	59	1.00	0.00
EB	TH-RT	1255	2	1.05	1318	0.00	0.14
WB	LT	43	1	1.00	43	1.00	0.00
WB	TH	989	2	1.05	1039	0.00	0.00
WB	RT	106	1	1.00	106	0.00	1.00
NB	LT-TH-RT	537	2	1.05	564	0.23	0.22
SB	LT	122	1	1.00	122	1.00	0.00
SB	TH-RT	436	2	1.05	458	0.00	0.32

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	43	989	106	100	100	0	1	2	1	989
WESTBOUND	59	1080	176	100	100	100	1	2	0	1255
NORTHBOUND	122	298	138	0	83	83	1	2	0	361
SOUTHBOUND	122	298	117	100	100	100	0	2	0	537

SATURATION FLOW ADJUSTMENT WORKSHEET
[illegible]

EB	LT	1500	1	0.957	0.985	1.000	1.000	1.000	1.000	1.000	1.000	0.928	2[illegible]
EB	TH-RT	1500	2	0.957	0.985	1.000	1.000	0.982	1.000	0.979	1.000	2774
WB	LT	1500	1	1.000	0.985	1.000	1.000	1.000	1.000	1.000	0.112	1[illegible]5
WB	TH	1500	2	1.000	0.985	1.000	1.000	1.000	1.000	1.000	1.000	3547
WB	RT	1500	1	1.000	0.985	1.000	1.000	0.982	1.000	0.85[illegible]	1.000	1235
NB	LT-TH-RT	1700	2	1.000	0.955	1.000	1.000	1.000	1.000	0.967	0.827	2[illegible]6
SB	LT	1500	1	0.957	0.985	1.000	1.000	1.000	1.000	1.000	0.950	117[illegible]
SB	TH-RT	1800	2	0.957	0.985	1.000	1.000	1.000	1.000	0.952	1.000	326[illegible]

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Plt	No	Vc	Plto
EB	110	63	1	59	1255	59	1.00	2	987	0.00
WB	110	63	1	43	1056	43	1.00	2	1255	0.00
NB	110	32	2	537	537	122	0.23	2	361	0.00

CALCULATIONS

DIR	Sbo	Yo	Gu	Fs	Pl	Go	Pt	Sf	El	Fm	Flt
EB	3600	0.275	45.754	0.257	1.000	17.65[illegible]	0.000	0.000	4.733	0.228	0.226
WB	3600	0.349	38.467	0.090	1.000	24.944	0.000	0.000	12.441	0.112	0.112
NB	3600	0.100	23.263	0.649	0.599	8.706	0.401	1.313	1.733	0.647	0.623

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	59	272	0.21	0.58	157	0.37	
EB	TH-RT	1318	2774	0.48	0.58	1599	0.82	*
WB	LT	43	165	0.26	0.58	95	0.45	
WB	TH	1059	3547	0.29	0.58	2045	0.51	
WB	RT	106	1235	0.09	0.58	712	0.15	
NB	LT-TH-RT	564	2688	0.21	0.29	775	0.73	*
SB	LT	122	1176	0.04	0.06	197	0.62	*
SB	TH-RT	458	3265	0.14	0.35	1146	0.40	

CYCLE=110.0 LOST= 8.0 SUM V/S CRIT= 0.72 TOTAL V/C= 0.78

FOR THE SOUTHBOUND PROTECTED/PERMISSIVE LEFT TURN LANE THE CAPACITY, V/S AND V/C RATIOS HAVE ALL BEEN ADJUSTED TO REFLECT A CAPACITY FOR 45 LEFT TURNS ON THE CHANGE INTERVAL AND 81 ON THE PERMISSIVE PHASE

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.37	0.58	110.0	9.55	157	0.71	1.00	10.26	B	0.8	1
EB	TH-RT	0.82	0.58	110.0	14.29	1599	2.60	1.00	16.88	C	16.2	19
WB	LT	0.45	0.58	110.0	10.10	95	2.21	1.00	12.31	B	0.6	1
WB	TH	0.51	0.58	110.0	10.60	2045	0.18	1.00	10.78	B	12.8	13
WB	RT	0.15	0.58	110.0	8.21	712	0.01	1.00	8.21	B	1.4	1
NB	LT-TH-RT	0.73	0.29	110.0	26.67	775	2.41	1.00	29.08	D	11.6	14
SB	LT	0.62	0.35	110.0	22.53	197	4.14	1.00	26.66	D	3.5	4
SB	TH-RT	0.40	0.35	110.0	20.49	1146	0.13	1.00	20.62	C	6.7	9

DIR	Delay	LOS
EB	16.60	C
WB	10.61	B
NB	29.08	D
SB	21.90	C

INTERSECTION DELAY = 17.41 INTERSECTION LOS=C

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 33.6 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 6[illegible].7 secs green. 4.0 secs yellow + red clear
suggested timing phase 2 is 5.3 secs green. 0.0 secs yellow + red clear
suggested timing phase 3 is 29.8 secs green. 4.0 secs yellow + red clear

SWD
2825.12

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND MELNEA CASS BLVD
EXISTING AM PEAK
date:03-07-1991 time:11:43:17
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAMEEXAM GEOMETRICS=MAMEEXAM SIGNAL=MAMEEXAM
LOCATED IN CBD:Y
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	412	385	1	2	2	0	10.5	12.0	0.0	38
WB	404	843	13	1	3	0	13.0	14.0	0.0	45
NB	18	562	337	1	3	0	9.0	12.0	0.0	45
SB	242	621	587	1	2	1	10.0	14.0	12.0	52

reduced by 250 for R.O.R

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK			PEDESTRIANS		ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS BUT MIN TIME	TYPE
EB	0.0%	0.0%		0	0	.950	0 18.3	3
WB	0.0%	0.0%		0	0	.950	0 18.3	3
NB	0.0%	0.0%		0	0	.950	0 20.0	3
SB	0.0%	0.0%		0	0	.950	0 20.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1									*				*				5.0	3	A
2													*	*	*		14.0	0	A
3										*	*			*	*		28.0	4	A
4					*	*	*										28.0	4	A
5	*	*	*												*		20.0	4	A

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	412	385	1	.950	434	405	1
WB	404	843	13	.950	425	887	14
NB	18	562	337	.950	19	592	355
SB	242	621	587	.950	255	654	618

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	PIt	Prt
EB	LT	434	2	1.05	455	1.00	0.00
EB	TH-RT	406	2	1.05	427	0.00	0.00
WB	LT	425	1	1.00	425	1.00	0.00
WB	TH-RT	901	3	1.10	991	0.00	0.02
NB	LT	19	1	1.00	19	1.00	0.00
NB	TH-RT	946	3	1.10	1041	0.00	0.37
SB	LT	255	1	1.00	255	1.00	0.00
SB	TH	654	2	1.05	686	0.00	0.00
SB	RT	618	1	1.00	618	0.00	1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	425	887	14	0	0	0	1	3	0	0
WESTBOUND	434	405	1	0	0	0	2	2	0	0
NORTHBOUND	255	654	618	0	0	0	1	2	1	0
SOUTHBOUND	19	592	355	100	0	0	1	3	0	0

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fgr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT	1800	2	0.950	1.000	1.000	1.000	1.000	0.900	1.000	0.950	2832
EB	TH-RT	1800	2	1.000	1.000	1.000	1.000	1.000	0.900	1.000	1.000	3239
WB	LT	1800	1	1.033	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1590
WB	TH-RT	1800	3	1.067	1.000	1.000	1.000	1.000	0.900	0.998	1.000	5172
NB	LT	1800	1	0.900	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1385
NB	TH-RT	1800	3	1.000	1.000	1.000	1.000	1.000	0.900	0.944	1.000	4587
SB	LT	1800	1	0.933	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1436
SB	TH	1800	2	1.067	1.000	1.000	1.000	1.000	0.900	1.000	1.000	3456
SB	RT	1800	1	1.000	1.000	1.000	1.000	1.000	0.900	0.850	1.000	1377

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	455	2832	0.16	0.18	515	0.88	*
EB	TH-RT	427	3239	0.13	0.18	589	0.72	
WB	LT	425	1590	0.27	0.25	405	1.05	*
WB	TH-RT	991	5172	0.19	0.25	1317	0.75	
NB	LT	19	1385	0.01	0.05	63	0.30	
NB	TH-RT	1041	4587	0.23	0.25	1168	0.89	*
SB	LT	255	1436	0.18	0.17	248	1.03	*
SB	TH	688	3456	0.20	0.38	1320	0.52	
SB	RT	618	1377	0.45	0.56	776	0.80	

CYCLE=110.0 LOST=12.0 SUM V/S CRIT= 0.83 TOTAL V/C= 0.93

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.88	0.18	110.0	33.34	515	11.71	1.00	45.05	E	10.8	17
EB	TH-RT	0.72	0.18	110.0	32.23	589	3.06	0.85	29.99	D	10.2	11
WB	LT	1.05	0.25	110.0	31.71	405	49.73	1.00	81.44	F	14.5	30
WB	TH-RT	0.75	0.25	110.0	28.73	1317	1.75	0.85	25.91	D	20.5	21
NB	LT	0.30	0.05	110.0	38.61	63	0.83	1.00	39.44	D	0.6	1
NB	TH-RT	0.89	0.25	110.0	30.05	1168	6.38	0.85	30.97	D	21.6	25
SB	LT	1.03	0.17	110.0	34.77	248	52.05	1.00	86.83	F	9.4	19
SB	TH	0.52	0.38	110.0	19.93	1320	0.31	0.85	17.20	C	12.3	12
SB	RT	0.80	0.56	110.0	14.44	776	4.05	0.85	15.71	C	8.2	9

DIR	Delay	LOS
EB	37.77	D
WB	42.59	E
NB	31.12	D
SB	27.99	D

INTERSECTION DELAY = 34.62 INTERSECTION LOS=D

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 97.0 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 9.7 secs green. 3.0 secs yellow + red clear
suggested timing phase 2 is 8.1 secs green. 0.0 secs yellow + red clear
suggested timing phase 3 is 26.7 secs green. 4.0 secs yellow + red clear
suggested timing phase 4 is 31.5 secs green. 4.0 secs yellow + red clear
suggested timing phase 5 is 18.9 secs green. 4.0 secs yellow + red clear

[illegible] PROGRAM - [illegible]
[illegible] - [illegible] AFTER PH [illegible] - [illegible]
[illegible] WHEN AND [illegible] CASE [illegible]
[illegible]-BLOCK [illegible] [illegible]
[illegible]:04-[illegible] [illegible]:[illegible]:[illegible]
[illegible] DATA SET NAMES [illegible] [illegible]
VOLUME=NAMENBA= GEOMETRICS=NAMENBM BIGRAD=NAMENBH
LOCATED IN [illegible]
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	410	390	5	2	2	0	10.5	12.0	0.0	36
WB	420	840	15	1	2	0	10.0	14.0	0.0	45
NB	20	595	355	1	3	0	9.0	12.0	0.0	45
SB	225	705	560	1	2	1	10.0	14.0	12.0	52

REDUCED BY 250 FOR ROR

TRAFFIC & ROADWAY CONDITIONS

		ADJ FACT			PEDESTRIANS			ARR
DIR	GRADE	%HV	% MOVES	BUSES	PHF	CROSS	BLT	MIN TIME	TYPE
EB	0.0%	0.0%	0	0	.950	0		15.0	3
WB	0.0%	0.0%	0	0	.950	0		15.0	3
NB	0.0%	0.0%	0	0	.950	0		20.0	3
SB	0.0%	0.0%	0	0	.950	0		10.0	3

PHASING

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	YEL	PRE/MOT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1									*				*				9.0	3	A
2													*	*	*		7.4	3	A
3										*	*			*	*		25.0	4	A
4					*	*	*										10.0	4	A
5	*	*	*													*	19.1	4	A

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTPR	THPR	RTPR
EB	410	390	5	.950	432	411	5
WB	420	840	15	.950	442	884	16
NB	20	595	355	.950	21	626	374
SB	225	705	560	.950	237	742	589

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	V	Plt	Prt
EB	LT	432	2	1.05	452	1.00	0.00
EB	TH-RT	416	2	1.05	437	0.00	0.01
WB	LT	442	1	1.00	442	1.00	0.00
WB	TH-RT	900	3	1.10	990	0.00	0.02
NB	LT	21	1	1.00	21	1.00	0.00
NB	TH-RT	1000	3	1.10	1100	0.00	0.77
SB	LT	237	1	1.00	237	1.00	0.00
SB	TH	742	2	1.05	779	0.00	0.00
SB	RT	589	1	1.00	589	0.00	1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH											
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	452	884	16	0	[illegible]	[illegible]	1	2	[illegible]	[illegible]
WESTBOUND	432	411	5	[illegible]	[illegible]	[illegible]	2	2	[illegible]	[illegible]
NORTHBOUND	237	742	589	[illegible]	[illegible]	[illegible]	1	2	[illegible]	[illegible]
SOUTHBOUND	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	[illegible]	[illegible]

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwd	Fhv	Fpb	Fbpb	Fbus	Fmes	Fhc	Fvt	s
EB	LT	1800	2	0.950	1.000	1.000	1.000	1.000	0.900	1.000	0.950	2832
EB	TH-RT	1800	2	1.000	1.000	1.000	1.000	1.000	0.900	0.998	1.000	3224
WB	LT	1800	1	1.000	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1590
WB	TH-RT	1800	3	1.067	1.000	1.000	1.000	1.000	0.900	0.997	1.000	5170
NB	LT	1800	1	0.900	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1385
NB	TH-RT	1800	3	1.000	1.000	1.000	1.000	1.000	0.900	0.944	1.000	4588
SB	LT	1800	1	0.900	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1476
SB	TH	1800	2	1.067	1.000	1.000	1.000	1.000	0.900	1.000	1.000	3456
SB	RT	1800	1	1.000	1.000	1.000	1.000	1.000	0.900	0.850	1.000	1377

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	p.C	c	v/c	CRITICAL
EB	LT	452	2832	0.16	0.17	491	0.92	*
EB	TH-RT	437	3224	0.14	0.17	561	0.78	
WB	LT	452	1590	0.28	0.31	491	0.92	*
WB	TH-RT	990	5170	0.19	0.31	1596	0.62	
NB	LT	21	1385	0.02	0.08	116	0.18	
NB	TH-RT	1100	4588	0.24	0.23	1055	1.04	*
SB	LT	237	1436	0.16	0.15	218	1.09	*
SB	TH	779	3456	0.23	0.30	1028	0.76	
SB	RT	589	1377	0.43	0.47	649	0.91	

CYCLE=110.0 LOST=12.0 SUM V/S CRIT= 0.85 TOTAL V/C= 0.95

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	p.C	C	d1	c	d2	FF	Delay	LOS	Avg C	95% G
EB	LT	0.92	0.17	110.0	33.99	491	16.50	1.00	50.49	E	11.5	19
EB	TH-RT	0.78	0.17	110.0	33.01	561	4.75	0.85	32.09	D	10.5	12
WB	LT	0.92	0.31	110.0	27.92	491	16.51	1.00	44.44	E	10.4	18
WB	TH-RT	0.62	0.31	110.0	24.71	1596	0.54	0.85	21.46	C	19.0	19
NB	LT	0.18	0.08	110.0	35.61	116	0.09	1.00	35.70	D	0.6	1
NB	TH-RT	1.04	0.23	110.0	32.60	1055	33.03	0.85	55.79	E	27.7	47
SB	LT	1.09	0.15	110.0	36.03	218	78.75	1.00	114.79	F	10.6	24
SB	TH	0.76	0.30	110.0	26.64	1028	2.31	0.85	24.60	C	15.9	16
SB	RT	0.91	0.47	110.0	20.45	649	12.00	0.85	27.61	D	9.5	14

DIR Delay LOS
EB 41.46 E
WB 28.67 D
NB 55.41 E
SB 39.01 D
INTERSECTION DELAY = 40.13 INTERSECTION LOS=E

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 110.2 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 5.9 secs green. 3.0 secs yellow + red clear
suggested timing phase 2 is 7.1 secs green. 0.0 secs yellow + red clear
suggested timing phase 3 is 27.7 secs green. 4.0 secs yellow + red clear
suggested timing phase 4 is 32.8 secs green. 4.0 secs yellow + red clear
suggested timing phase 5 is 18.5 secs green. 4.0 secs yellow + red clear

[illegible] PROGRAM VERSION DATE [illegible]
[illegible] - [illegible] AFTER [illegible] [illegible] - [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible]
[illegible] [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] [illegible]
LOCATED IN [illegible]
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	425	400	5	2	2	0	10.0	12.0	0.0	35
WB	430	865	15	1	3	0	12.0	14.0	0.0	45
NB	20	595	355	1	2	0	9.0	12.0	0.0	45
SB	225	705	815	1	2	1	10.0	14.0	12.0	52

REDUCED BY 300 FOR ROR (α TO VOLUME)

TRAFFIC & ROADWAY CONDITIONS

		ADJ PARK			PEDESTRIANS			ARR
DIR	GRADE %	V/H	MOVES	SLEEP	PHF	CROSS	ELT	MIN TIME TYPE
EB	0.0%	0.0%	0	0	.950	0		16.0 3
WB	0.0%	0.0%	0	0	.950	0		16.0 3
NB	0.0%	0.0%	0	0	.950	0		20.0 3
SB	0.0%	0.0%	0	0	.950	0		20.0 3

PHASING

	EASTBOUND			WESTBOUND			NORTHBOUND			SOUTHBOUND			GREEN	Y+R	PRE	ACT
	L	T	R	L	T	R	L	T	R	L	T	R				
1							*				*		5.0	3		H
2										*	*	*	14.0	3		H
3								*	*		*	*	25.0	4		A
4				*	*	*							21.0	4		A
5	*	*	*									*	15.0	4		A

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS.

DIR	LTV	THV	RTV	PHF	LTPR	THPR	RTPR
EB	425	400	5	.950	447	421	5
WB	430	865	15	.950	453	911	16
NB	20	595	355	.950	21	626	374
SB	225	705	815	.950	237	742	858

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	V	Plt	Prt
EB	LT	447	2	1.05	470	1.00	0.00
EB	TH-RT	426	2	1.05	448	0.00	0.01
WB	LT	453	1	1.00	453	1.00	0.00
WB	TH-RT	920	3	1.10	1015	0.90	0.02
NB	LT	21	1	1.00	21	1.00	0.00
NB	TH-RT	1000	3	1.10	1100	0.00	0.37
SB	LT	237	1	1.00	237	1.00	0.00
SB	TH	742	2	1.05	779	0.00	0.00
SB	RT	858	1	1.00	858	0.00	1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN				OPPOSING APPROACH						
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	453	911	16	0		0	1	3	1	[illegible]
WESTBOUND	447	421	5	0		0	2	2	0	[illegible]
NORTHBOUND	237	742	858	0			1	2	1	[illegible]
SOUTHBOUND	[illegible]	[illegible]	[illegible]	[illegible]				2	1	

SATURATION FLOW ANALYSIS WORKSHEET

DIR	LN GROUP	IDEAL	N	FWIC	FP	Fcr	Fcam	Flu	Fprec	Fpt	Fit	s
EB	LT	1810	1	1.000	1.000	1.000	1.000	1.000	0.850	1.000	0.950	1632
EB	TH+RT	1810	2	1.000	1.000	1.000	1.000	1.000	0.850	0.995	1.000	3224
WB	LT	1810	1	1.000	1.000	1.000	1.000	1.000	0.850	1.000	0.950	1596
WB	TH+RT	1810	2	1.000	1.000	1.000	1.000	1.000	0.850	0.977	1.000	3171
NB	LT	1810	1	0.900	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1785
NB	TH+RT	1810	2	1.000	1.000	1.000	1.000	1.000	0.900	0.944	1.000	4555
SB	LT	1810	1	1.000	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1436
SB	TH	1810	2	1.000	1.000	1.000	1.000	1.000	0.900	1.000	1.000	3456
SB	RT	1810	1	1.000	1.000	1.000	1.000	1.000	0.900	0.850	1.000	1377

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	V	S	V/S	D	C	C	V/C	CRITICAL
EB	LT	470	2820	0.17	0.17	469	0.91		
EB	TH+RT	445	3224	0.14	0.17	539	0.80		
WB	LT	450	1596	0.28	0.28	442	1.01		*
WB	TH+RT	1019	5171	0.20	0.28	1457	0.70		
NB	LT	21	1785	0.02	0.05	85	0.27		*
NB	TH+RT	1100	4555	0.24	0.24	1084	1.01		
SB	LT	227	1436	0.16	0.17	248	0.92		
SB	TH	779	3456	0.23	0.26	1257	0.62		
SB	RT	559	1377	0.41	0.54	739	1.16		*

CYCLE=110.0 LOST=15.0 SUM V/S IFIT= 0.92 TOTAL V/C= 1.07

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	V/C	D	C	d1	c	d2	PF	Delay	LOS	Avg D	95% D
EB	LT	0.91	0.17	110.0	34.70	469	20.68	1.00	55.38	E	12.7	22
EB	TH+RT	0.80	0.17	110.0	37.20	539	5.19	0.85	32.46	C	10.8	13
WB	LT	1.01	0.28	110.0	32.14	442	35.71	1.00	65.44	F	17.2	26
WB	TH+RT	0.70	0.28	110.0	26.85	1457	1.02	0.85	27.72	C	20.7	29
NB	LT	0.22	0.05	110.0	38.57	85	1.12	1.00	39.69	D	0.2	1
NB	TH+RT	1.01	0.24	110.0	31.38	1084	24.53	0.85	48.08	E	25.0	41
SB	LT	0.92	0.17	110.0	34.26	248	22.21	1.00	56.26	F	7.4	14
SB	TH	0.62	0.26	110.0	31.55	1257	0.68	0.85	19.16	C	14.4	19
SB	RT	1.16	0.54	110.0	22.82	739	90.56	0.85	97.23	F	29.2	70

DIR	Delay	LOS
EB	45.29	E
WB	36.56	D
NB	47.93	E
SB	60.93	F

INTERSECTION DELAY = 42.90 INTERSECTION LOS=E

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 0 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 524.6 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 1.6 secs green. 3.0 secs yellow + red clear
suggested timing phase 2 is 19.7 secs green. 3.0 secs yellow + red clear
suggested timing phase 3 is 44.4 secs green. 4.0 secs yellow + red clear
suggested timing phase 4 is 29.3 secs green. 4.0 secs yellow + red clear
suggested timing phase 5 is 24.1 secs green. 4.0 secs yellow + red clear

```
SIGNAL PROGRAM DEFAULT TIME [illegible]
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND MELVEN CASE DRIVE
BUILD VITIGATED AM PEAK HOUR
Date:04-23-1991                    time:08:37:00
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAMEEMAM   GEOMETRIC=MAIEBMEM   SIGNAL=MAMEEMAM
LOCATED IN DEO:
VOLUME & GEOMETRIC
```

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	410	390	5	2	2	0	12.5	12.0	0.0	35
WB	430	850	25	1	3	0	13.0	14.0	0.0	45
NB	20	605	355	1	3	0	9.0	12.0	0.0	45
SB	225	705	570	1	2	1	10.0	14.0	12.0	50

REDUCED BY 250 FOR ROR

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TRAFFIC & ROADWAY CONDITIONS
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			ADJ PARA			PEDESTRIAN			PRE
DIR	GRADE %	PARK	VOLUME	BUSES	PHF	CROSS	B.T	MIN TIME	TYPE
EB	0.0%	0.0%		0	.950	0		18.0	3
WB	0.0%	0.0%		0	.950	0		18.0	3
NB	0.0%	0.0%		0	.950	0		20.0	3
SB	0.0%	0.0%		0	.950	0		20.0	3

```
PHASING
```

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	MIN	PRE-MOT
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
1									1				1				5.0	3	A
2													1	1	1		14.0	0	H
3										1	1			1	1		23.0	4	H
4					1	1	1										31.0	4	P
5	1	1	1													1	19.0	4	A

```
CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
```

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	410	390	5	.950	432	411	5
WB	430	850	25	.950	453	895	26
NB	20	605	355	.950	21	637	374
SB	225	705	570	.950	237	742	600

```
PART 2 (LANE GROUP ADJUSTMENTS)
```

DIR	LN GROUP	FLOW	N	LU	V	Plt	Prt
EB	LT	432	2	1.05	453	1.00	0.00
EB	TH-RT	416	2	1.05	437	0.00	0.01
WB	LT	453	1	1.00	453	1.00	0.00
WB	TH-RT	921	3	1.10	1013	0.00	0.03
NB	LT	21	1	1.00	21	1.00	0.00
NB	TH-RT	1011	3	1.10	1112	0.00	0.37
SB	LT	237	1	1.00	237	1.00	0.00
SB	TH	742	2	1.05	779	0.00	0.00
SB	RT	600	1	1.00	600	0.00	1.00

```
PART 3 (OPPOSING VOLUME ADJUSTMENTS)
```

LEFT TURN BEING OPPOSED	VOLUMES			OPPOSING APPROACH: EFFECTIVE LEFT TURN			# LANES			OPPOSING VOLUME
	LT	TH	RT	LT	TH	RT	LT	TH	RT	
EASTBOUND	453	895	26	0	0	0	1	2	1	[illegible]
WESTBOUND	432	411	5	0	0	0	1	2	0	[illegible]
NORTHBOUND	237	742	0	[illegible]	0	0	1	2	[illegible]	[illegible]
SOUTHBOUND	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SATURATION FLOW [illegible] WORKSHEET

DIR	LN GROUP	IDEAL	W	Phf	Pv	Pcr	Pcrs	Pbus	Pares	Pxc	Pix	s
EB	LT	1900	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EB	TH-RT	1900	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
WB	LT	1900	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
WB	TH-RT	1900	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NB	LT	1900	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NB	TH-RT	1900	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SB	LT	1900	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SB	TH	1900	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SB	RT	1900	1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	450	2832	0.16	0.17	455	0.99	*
EB	TH-RT	427	2924	0.14	0.17	559	0.76	
WB	LT	450	1590	0.28	0.28	445	1.01	*
WB	TH-RT	1013	5162	0.20	0.28	1455	0.70	
NB	LT	21	1355	0.02	0.05	67	0.32	
NB	TH-RT	1112	4560	0.24	0.24	1085	1.02	*
SB	LT	227	1420	0.16	0.17	248	0.95	*
SB	TH	779	3486	0.22	0.36	1257	0.62	
SB	RT	690	1277	0.54	.54	709	0.81	

CYCLE=110.0 LOST=12.0 SUM V/S CRIT= 0.55 TOTAL V/C= 0.92

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg D	95% Q
EB	LT	0.99	0.17	110.0	34.06	455	17.14	1.00	51.20	E	11.6	15
EB	TH-RT	0.76	0.17	110.0	33.57	559	4.90	0.85	32.27	D	16.5	12
WB	LT	1.01	0.28	110.0	38.14	445	35.31	1.00	85.44	F	17.2	26
WB	TH-RT	0.70	0.28	110.0	28.87	1455	1.94	0.85	22.28	C	20.2	28
NB	LT	0.32	0.05	110.0	38.27	67	1.18	1.00	39.85	D	0.6	1
NB	TH-RT	1.02	0.24	110.0	32.15	1085	27.20	0.85	50.46	E	26.0	40
SB	LT	0.95	0.17	110.0	34.26	248	32.61	1.00	66.86	F	7.4	14
SB	TH	0.62	0.36	110.0	21.85	1257	0.68	0.85	19.26	D	14.4	14
SB	RT	0.81	0.54	110.0	15.92	709	4.81	0.85	17.80	C	8.5	10

DIR Delay LOS
EB 41.91 E
WB 36.56 D
NB 50.26 E
SB 35.55 D
INTERSECTION DELAY = 37.6 INTERSECTION LOS=D

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 116.0 SECONDS
for chosen cycle length 110.0
suggested timing phase 1 is 8.9 secs green. 3.0 secs yellow + red clear
suggested timing phase 2 is 7.1 secs green. 3.0 secs yellow + red clear
suggested timing phase 3 is 27.9 secs green. 4.0 secs yellow + red clear
suggested timing phase 4 is 32.8 secs green. 4.0 secs yellow + red clear
suggested timing phase 5 is 18.4 secs green. 4.0 secs yellow + red clear

SWD
2825.1

CINCH PROGRAM VERSION DATE 4-09-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND MELNEA CASS BLVD
EXISTING PM PEAK
date:04-04-1991 time:13:49:10
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=mameexpm GEOMETRICS=mameexpm SIGNAL=mame2xPM
LOCATED IN CBD:Y
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	670	~~602~~ 607	2	2	2	0	10.5	12.0	0.0	38
WB	323	385	14	1	3	0	13.0	14.0	0.0	45
NB	18	899	327	1	3	0	9.0	12.0	0.0	45
SB	181	749	347	1	2	1	10.0	14.0	12.0	52

reduced by 250 for R.O.R.

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK			PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N MOVES	BUSES	PHF	CROSS	BUT MIN	TIME	TYPE
EB	0.0%	0.0%	0	0	.950	0		18.3	3
WB	0.0%	0.0%	0	0	.950	0		18.3	3
NB	0.0%	0.0%	0	0	.950	0		20.0	3
SB	0.0%	0.0%	0	0	.950	0		20.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1									*				*				6.4	3	A
2													*	*	*		4.9	0	A
3										*	*			*	*		32.7	4	A
4					*	*	*										23.0	4	A
5	*	*	*												*		28.1	4	A

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	670	602	2	.950	705	634	2
WB	323	385	14	.950	340	405	15
NB	18	899	327	.950	19	946	344
SB	181	749	347	.950	191	788	365

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	705	2	1.05	741	1.00	0.00
EB	TH-RT	636	2	1.05	668	0.00	0.00
WB	LT	340	1	1.00	340	1.00	0.00
WB	TH-RT	420	3	1.10	462	0.00	0.04
NB	LT	19	1	1.00	19	1.00	0.00
NB	TH-RT	1291	3	1.10	1420	0.00	0.27
SB	LT	191	1	1.00	191	1.00	0.00
SB	TH	788	2	1.05	828	0.00	0.00
SB	RT	365	1	1.00	365	0.00	1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN BEING OPPOSED	OPPOSING APPROACH VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	340	405	15	0	0	0	1	3	0	0
WESTBOUND	705	634	2	0	0	0	2	2	0	0
NORTHBOUND	191	788	365	0	0	0	1	2	1	0
SOUTHBOUND	19	946	344	100	0	0	1	3	0	0

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fcr	Fpark	Fbus	Farea	Frt	Flt	s
EB	LT	1800	2	0.950	1.000	1.000	1.000	1.000	0.900	1.000	0.920	2832
EB	TH-RT	1800	2	1.000	1.000	1.000	1.000	1.000	0.900	1.000	1.000	3238
WB	LT	1800	1	1.033	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1590
WB	TH-RT	1800	3	1.067	1.000	1.000	1.000	1.000	0.900	0.995	1.000	5157
NB	LT	1800	1	0.900	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1385
NB	TH-RT	1800	3	1.000	1.000	1.000	1.000	1.000	0.900	0.960	1.000	4666
SB	LT	1800	1	0.933	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1436
SB	TH	1800	2	1.067	1.000	1.000	1.000	1.000	0.900	1.000	1.000	3456
SB	RT	1800	1	1.000	1.000	1.000	1.000	1.000	0.900	0.850	1.000	1377

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT	741	2832	0.26	0.26	723	1.02	*
EB	TH-RT	668	3238	0.21	0.26	827	0.81	
WB	LT	340	1590	0.21	0.21	332	1.02	*
WB	TH-RT	462	5157	0.09	0.21	1077	0.43	
NB	LT	19	1385	0.01	0.06	80	0.24	
NB	TH-RT	1420	4666	0.30	0.30	1386	1.02	*
SB	LT	191	1436	0.13	0.10	147	1.30	*
SB	TH	829	3456	0.24	0.34	1181	0.70	
SB	RT	365	1377	0.27	0.60	822	0.44	

CYCLE=110.0 LOST=12.0 SUM V/S CRIT= 0.91 TOTAL V/C= 1.02

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	g1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	1.02	0.26	110.0	31.38	723	31.98	1.00	63.36	F	20.4	38
EB	TH-RT	0.81	0.26	110.0	29.19	827	4.16	0.85	28.35	D	14.5	16
WB	LT	1.02	0.21	110.0	33.28	332	44.86	1.00	78.14	F	11.5	23
WB	TH-RT	0.43	0.21	110.0	28.74	1077	0.18	0.85	24.58	C	10.2	10
NB	LT	0.24	0.06	110.0	37.62	80	0.29	1.00	37.91	D	0.5	1
NB	TH-RT	1.02	0.30	110.0	29.68	1386	24.52	0.85	46.07	E	30.4	50
SB	LT	1.30	0.10	110.0	38.84	147	225.81	1.00	264.65	F	16.6	43
SB	TH	0.70	0.34	110.0	23.83	1181	1.32	0.85	21.37	C	15.9	16
SB	RT	0.44	0.60	110.0	9.24	822	0.26	0.85	8.08	B	4.5	4

DIR	Delay	LOS
EB	46.76	E
WB	47.29	E
NB	45.97	E
SB	51.36	E

INTERSECTION DELAY = 47.88 INTERSECTION LOS=E

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 301.7 SECONDS
THE EXISTING TIMING IS OPTIMAL

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CINCH PROGRAM VERSION DATE 4-OCT-1985
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND MELNEA CASS BLVD
NO-BUILD PM PEAK HOUR
date:04-16-1991              time:12:17:16
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAMENBPM   GEOMETRICS=MAMENBPM   SIGNAL=MAMENBPM
LOCATED IN CBD:1
VOLUME & GEOMETRICS
        VOLUMES        # OF LANES      LANE WIDTH      CROSS
DIR  LT   TH   RT     LT TH RT       LT   TH   RT     WALK
EB  495  795    5      2  2  0      10.5 12.0  0.0     38
WB  340  340   15      1  3  0      13.0 14.0  0.0     45
NB   20  930  345      1  3  0       9.0 12.0  0.0     45
SB  190  805  455      1  2  1      10.0 14.0 12.0     52
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REDUCED BY 250 FOR R.O.R.
(α TO VOLUME)

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TRAFFIC & ROADWAY CONDITIONS
                    ADJ PARK                PEDESTRIANS        ARR
DIR GRADE %HV   Y/N MOVES BUSES  PHF CROSS BUT MIN TIME TYPE
EB  0.0%  0.0%        0     0   .950    0        18.3    3
WB  0.0%  0.0%        0     0   .950    0        18.3    3
NB  0.0%  0.0%        0     0   .950    0        20.0    3
SB  0.0%  0.0%        0     0   .950    0        20.0    3

PHASINGS
    EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  Y+R PRE/ACT
    l  t  r  p  l  t  r  p  l  t  r  p  l  t  r  p
 1                          *           *            6.9   3    A
 2                                      *  *  *      5.2   0    A
 3                             *  *        *  *     34.3   4    A
 4              *  *  *                            24.4   4    A
 5  *  *  *                                  *     24.2   4    A

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTFR THFR RTFR
EB   495  795    5  .950   521  837    5
WB   340  340   15  .950   358  358   16
NB    20  930  345  .950    21  979  363
SB   190  805  455  .950   200  847  479

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Plt  Prt
EB  LT         521 2 1.05  547 1.00 0.00
EB  TH-RT      842 2 1.05  884 0.00 0.01
WB  LT         358 1 1.00  358 1.00 0.00
WB  TH-RT      374 3 1.10  411 0.00 0.04
NB  LT          21 1 1.00   21 1.00 0.00
NB  TH-RT     1342 3 1.10 1476 0.00 0.27
SB  LT         200 1 1.00  200 1.00 0.00
SB  TH         847 2 1.05  890 0.00 0.00
SB  RT         479 1 1.00  479 0.00 1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)
LEFT TURN                OPPOSING APPROACH
BEING OPPOSED       VOLUMES      % OPPOSING LEFT TURN    # LANES     OPPOSING
                 LT   TH   RT        LT   TH   RT       LT  TH  RT    VOLUME
EASTBOUND       358  355   16         0    0    0        1   3   0       0
WESTBOUND       521  837    5         0    0    0        2   2   0       0
NORTHBOUND      200  847  479         0    0    0        1   2   1       0
SOUTHBOUND       21  979  363       100    0    0        1   3   0       0
```

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL	N	Fwid	Fhv	Fpr	Fpark	Fpus	Farea	Frt	Flt	s
EB	LT	1800	2	0.950	1.000	1.000	1.000	1.000	0.900	1.000	0.920	2832
EB	TH-RT	1800	2	1.000	1.000	1.000	1.000	1.000	0.900	1.999	1.000	3237
WB	LT	1800	1	1.033	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1590
WB	TH-RT	1800	3	1.067	1.000	1.000	1.000	1.000	0.900	0.994	1.000	5151
NB	LT	1800	1	0.900	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1385
NB	TH-RT	1800	3	1.000	1.000	1.000	1.000	1.000	0.900	0.959	1.000	4663
SB	LT	1800	1	0.933	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1436
SB	TH	1800	2	1.067	1.000	1.000	1.000	1.000	0.900	1.000	1.000	3456
SB	RT	1800	1	1.000	1.000	1.000	1.000	1.000	0.900	0.850	1.000	1377

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	c/C	c	v/c	CRITICAL
EB	LT	547	2832	0.19	0.22	624	0.88	
EB	TH-RT	884	3237	0.27	0.22	713	1.24	*
WB	LT	358	1590	0.23	0.22	352	1.02	*
WB	TH-RT	411	5151	0.08	0.22	1142	0.36	
NB	LT	21	1385	0.02	0.06	86	0.24	
NB	TH-RT	1476	4663	0.32	0.31	1454	1.02	*
SB	LT	200	1436	0.14	0.11	158	1.27	*
SB	TH	890	3456	0.26	0.36	1242	0.72	
SB	RT	479	1377	0.35	0.58	798	0.60	

CYCLE=110.0 LOST=12.0 SUM V/S CRIT= 0.95 TOTAL V/C= 1.07

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	d/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.88	0.22	110.0	31.50	624	9.44	1.00	40.93	E	12.4	19
EB	TH-RT	1.24	0.22	110.0	34.96	713	141.51	0.85	150.00	F	45.1	106
WB	LT	1.02	0.22	110.0	32.68	352	41.13	1.00	73.81	F	11.6	23
WB	TH-RT	0.36	0.22	110.0	27.52	1142	0.09	0.85	23.47	C	8.9	9
NB	LT	0.24	0.06	110.0	37.31	86	0.30	1.00	37.61	D	0.5	1
NB	TH-RT	1.02	0.31	110.0	28.97	1454	21.79	0.85	43.15	E	30.2	49
SB	LT	1.27	0.11	110.0	38.48	158	198.62	1.00	237.10	F	15.9	40
SB	TH	0.72	0.36	110.0	23.11	1242	1.41	0.85	20.84	C	16.6	17
SB	RT	0.60	0.58	110.0	11.33	798	0.92	0.85	10.41	B	6.2	6

DIR Delay LOS
EB 108.31 F
WB 46.90 E
NB 43.07 E
SB 45.23 E
INTERSECTION DELAY = 62.00 INTERSECTION LOS=F

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

THE V/C RATIO CAN'T BE .95 FOR THE GIVEN CONDITIONS
for chosen cycle length 110.0
suggested timing phase 1 is 6.4 secs green. 3.0 secs yellow + red clear
suggested timing phase 2 is 4.9 secs green. 0.0 secs yellow + red clear
suggested timing phase 3 is 32.5 secs green. 4.0 secs yellow + red clear
suggested timing phase 4 is 23.1 secs green. 4.0 secs yellow + red clear
suggested timing phase 5 is 28.1 secs green. 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-28-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE AND MELNEA CASS BLVD
BUILD PM PEAK HOUR
date:04-16-1991 time:12:20:24
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=NAMES■PM GEOMETRICS=NAMES■PM SIGNAL=NAMES■PM
LOCATED IN CBD:Y
VOLUME & GEOMETRICS

	VOLUMES			# OF LANES			LANE WIDTH			CROSS
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	WALK
EB	590	850	5	2	2	0	10.5	12.0	0.0	38
WB	340	345	15	1	3	0	13.0	14.0	0.0	45
NB	20	930	345	1	3	0	9.0	12.0	0.0	45
SB	190	805	510	1	2	1	10.0	14.0	12.0	52

REDUCED BY 250 FOR R.O.R

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK			PEDESTRIANS			ARR
DIR	GRADE	%HV	Y/N	MOVES	BUSES	PHF	CROSS	BUT MIN TIME	TYPE
EB	0.0%	0.0%		0	0	.950	0	18.3	3
WB	0.0%	0.0%		0	0	.950	0	18.3	3
NB	0.0%	0.0%		0	0	.950	0	20.0	3
SB	0.0%	0.0%		0	0	.950	0	20.0	3

PHASINGS

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	Y+R	PRE/ACT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1									*				*				6.7	3	A
2													*	*	*		5.1	0	A
3										*	*			*	*		33.6	4	A
4					*	*	*										23.9	4	A
5	*	*	*												*		25.7	4	A

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	590	850	5	.950	621	895	5
WB	340	345	15	.950	358	363	16
NB	20	930	345	.950	21	979	363
SB	190	805	510	.950	200	847	537

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	Plt	Prt
EB	LT	621	2	1.05	652	1.00	0.00
EB	TH-RT	900	2	1.05	945	0.00	0.01
WB	LT	358	1	1.00	358	1.00	0.00
WB	TH-RT	379	3	1.10	417	0.00	0.04
NB	LT	21	1	1.00	21	1.00	0.00
NB	TH-RT	1342	3	1.10	1476	0.00	0.27
SB	LT	200	1	1.00	200	1.00	0.00
SB	TH	847	2	1.05	890	0.00	0.00
SB	RT	537	1	1.00	537	0.00	1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	358	363	16	0	0	0	1	3	0	0
WESTBOUND	621	895	5	0	0	0	2	2	0	0
NORTHBOUND	200	847	537	[illegible]	0	0	1	2	1	0
SOUTHBOUND	21	[illegible]	[illegible]	[illegible]	0	0	1	3	0	0

SATURATION FLOW ADJUSTMENT WORKSHEET

DIR	LN GROUP	IDEAL M	Fwz	Fhv	Fpb	Fbpb	Fbz	Fbs	Frt	Flt	s
EB	LT	1800	1 1.000	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1522
EB	TH-RT	1800	2 1.000	1.000	1.000	1.000	1.000	0.900	0.959	1.000	3127
WB	LT	1800	1 1.000	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1590
WB	TH-RT	1800	3 1.000	1.000	1.000	1.000	1.000	0.900	0.954	1.000	5152
NB	LT	1800	1 0.900	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1285
NB	TH-RT	1800	3 1.000	1.000	1.000	1.000	1.000	0.900	0.959	1.000	4652
SB	LT	1800	1 0.900	1.000	1.000	1.000	1.000	0.900	1.000	0.950	1436
SB	TH	1800	2 1.000	1.000	1.000	1.000	1.000	0.900	1.000	1.000	3456
SB	RT	1800	1 1.000	1.000	1.000	1.000	1.000	0.900	0.850	1.000	1377

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	o/C	c	v/c	CRITICAL
EB	LT	652	2832	0.23	0.23	662	0.98	
EB	TH-RT	945	3127	0.29	0.23	757	1.25	*
WB	LT	358	1590	0.22	0.22	345	1.04	*
WB	TH-RT	417	5152	0.08	0.22	1119	0.37	
NB	LT	21	1285	0.02	0.06	84	0.25	
NB	TH-RT	1476	4653	0.32	0.31	1424	1.04	*
SB	LT	200	1436	0.14	0.11	154	1.30	*
SB	TH	869	3456	0.25	0.35	1215	0.72	
SB	RT	527	1377	0.39	0.59	806	0.67	

CYCLE=110.0 LOST=12.0 SUM V/S CRIT= 0.97 TOTAL V/C= 1.09

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	o/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT	0.98	0.23	110.0	31.87	662	23.36	1.00	55.23	E	16.8	30
EB	TH-RT	1.25	0.23	110.0	34.24	757	148.60	0.85	154.06	F	49.0	116
WB	LT	1.04	0.22	110.0	33.06	345	48.05	1.00	81.11	F	12.3	25
WB	TH-RT	0.37	0.22	110.0	27.87	1119	0.10	0.85	23.76	C	9.1	9
NB	LT	0.25	0.06	110.0	37.44	84	0.33	1.00	37.77	D	0.6	1
NB	TH-RT	1.04	0.31	110.0	29.50	1424	27.93	0.85	48.82	E	32.4	56
SB	LT	1.30	0.11	110.0	38.72	154	226.84	1.00	265.55	F	17.5	45
SB	TH	0.72	0.35	110.0	23.26	1215	1.61	0.85	21.45	C	16.3	17
SB	RT	0.67	0.59	110.0	11.76	806	1.47	0.85	11.25	B	6.8	7

DIR Delay LOS
EB 113.71 F
WB 50.26 E
NB 48.67 E
SB 48.12 E
INTERSECTION DELAY = 67.63 INTERSECTION LOS=F

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

THE V/C RATIO CAN'T BE .95 FOR THE GIVEN CONDITIONS
for chosen cycle length 110.0
suggested timing phase 1 is 6.3 secs green. 3.0 secs yellow + red clear
suggested timing phase 2 is 4.7 secs green. 0.0 secs yellow + red clear
suggested timing phase 3 is 31.9 secs green. 4.0 secs yellow + red clear
suggested timing phase 4 is 22.7 secs green. 4.0 secs yellow + red clear
suggested timing phase 5 is 29.4 secs green. 4.0 secs yellow + red clear

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INTER-PRIORITY LEVEL  DATE 4-12-1991
FOR 4X4 INTERSECTION W/ SIGNALIZED + OPERATIONAL ANALYSIS
MAGE AVE AND MELNER LAGE BLVD
BUILD MITIGATED PM PEAK HOUR
date:04-12-1991                time:13:52:55
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MAMEEMPM   GEOMETRICS=MAMEEMPM   SIGNAL=MAMEEMPM
LOCATED IN CBD:Y
VOLUME & GEOMETRICS
```

	VOLUMES			# OF LANES			LANE WIDTH			GRADE
DIR	LT	TH	RT	LT	TH	RT	LT	TH	RT	NAL%
EB	440	795	5	2	2	0	10.5	12.0	0.0	3B
WB	340	345	20	1	3	0	13.0	14.0	0.0	45
NB	20	930	345	1	3	0	9.0	12.0	0.0	45
SB	195	810	455	1	2	1	10.0	14.0	12.0	52

REDUCED BY 250 FOR ROR.

TRAFFIC & ROADWAY CONDITIONS

			ADJ PARK			PEDESTRIANS			AGR
DIR	GRADE	%HV	%M MOVES	%USES	PHF	CROSS	BUT	MIN TIME	TYPE
EB	0.0%	0.0%	0	0	.950	0		18.0	2
WB	0.0%	0.0%	0	0	.950	0		18.0	2
NB	0.0%	0.0%	0	0	.950	0		20.0	2
SB	0.0%	0.0%	0	0	.950	0		20.0	2

PHASING

	EASTBOUND				WESTBOUND				NORTHBOUND				SOUTHBOUND				GREEN	YEL	PRE/MOT
	l	t	r	p	l	t	r	p	l	t	r	p	l	t	r	p			
1									*				*				7.0	3	A
2													*	*	*		5.4	0	A
3										*	*			*	*		24.2	4	A
4					*	*	*										24.0	4	A
5	*	*	*												*		24.1	4	A

CYCLE= 110.0

VOLUME ADJUSTMENT WORKSHEET

PART 1 (MOVEMENT ADJUSTMENTS)

DIR	LTV	THV	RTV	PHF	LTFR	THFR	RTFR
EB	440	795	5	.950	463	837	5
WB	340	345	20	.950	358	363	21
NB	20	930	345	.950	21	979	363
SB	195	810	455	.950	205	853	479

PART 2 (LANE GROUP ADJUSTMENTS)

DIR	LN GROUP	FLOW	N	LU	v	P1t	Prt
EB	LT	463	2	1.05	486	1.00	0.00
EB	TH-RT	842	2	1.05	884	0.00	0.01
WB	LT	358	1	1.00	358	1.00	0.00
WB	TH-RT	384	3	1.10	422	0.00	0.05
NB	LT	21	1	1.00	21	1.00	0.00
NB	TH-RT	1342	3	1.10	1476	0.00	0.27
SB	LT	205	1	1.00	205	1.00	0.00
SB	TH	853	2	1.05	895	0.00	0.00
SB	RT	479	1	1.00	479	0.00	1.00

PART 3 (OPPOSING VOLUME ADJUSTMENTS)

LEFT TURN	OPPOSING APPROACH									
BEING OPPOSED	VOLUMES			% OPPOSING LEFT TURN			# LANES			OPPOSING
	LT	TH	RT	LT	TH	RT	LT	TH	RT	VOLUME
EASTBOUND	358	363	21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
WESTBOUND	463	837	5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NORTHBOUND	205	895	479	[illegible]	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SOUTHBOUND	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

DIR	LN	GROUP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EB	LT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EB	TH+RT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
WB	LT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
WB	TH+RT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NB	LT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NB	TH+RT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SB	LT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SB	TH		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
SB	RT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

CAPACITY ANALYSIS WORKSHEET

DIR	LN	GROUP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CRITICAL
EB	LT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
EB	TH+RT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	*
WB	LT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	*
WB	TH+RT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
NB	LT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
NB	TH+RT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	*
SB	LT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	*
SB	TH		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
SB	RT		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

CYCLE=110.0 LOST=12.0 SUM V/S CRIT= 0.[illegible] TOTAL V/C= 1.[illegible]

LEVEL OF SERVICE WORKSHEET

DIR	LN	GROUP	V/C	D/C	C	C1	C	dI	PF	Delay	LOS	Avg D	95% Q
EB	LT		0.75	0.22	110.0	21.75	221	4.49	1.00	35.23	D	11.0	15
EB	TH+RT		1.24	0.22	110.0	35.04	719	149.21	0.85	157.21	F	45.5	106
WB	LT		1.02	0.22	110.0	32.75	251	42.42	1.00	75.17	E	21.7	22
WB	TH+RT		1.07	0.22	110.0	27.66	1175	0.10	0.85	27.55	C	9.1	9
NB	LT		0.24	1.00	110.0	77.19	89	0.27	1.00	77.46	E	0.6	1
NB	TH+RT		1.02	0.21	110.0	35.37	1445	22.91	.85	44.15	E	21.6	50
SB	LT		1.27	0.11	110.0	35.25	161	195.22	1.00	224.60	F	16.2	41
SB	TH		0.72	0.36	110.0	22.14	1242	1.45	0.85	20.90	C	16.7	17
SB	RT		0.60	0.55	110.0	11.06	797	0.97	0.85	10.44	B	5.2	6

DIR Delay LOS
EB 111.25 F
WB 47.24 E
NB 44.09 E
SB 45.50 E
INTERSECTION DELAY = 62.62 INTERSECTION LOS=F

THE CYCLE LENGTH WITHIN THE BOUNDS OF 110 TO 110 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 110.0 SECONDS

THE V/C RATIO CAN'T BE .95 FOR THE GIVEN CONDITIONS
for chosen cycle length 110.0
suggested timing phase 1 is 6.0 secs green, 3.0 secs yellow + red clear
suggested timing phase 2 is 5.0 secs green, 0.0 secs yellow + red clear
suggested timing phase 3 is 22.4 secs green, 4.0 secs yellow + red clear
suggested timing phase 4 is 23.0 secs green, 4.0 secs yellow + red clear
suggested timing phase 5 is 26.0 secs green, 4.0 secs yellow + red clear

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)
DATE:01-29-1991 TIME:10:44:22
SOUTHAMPTON AND I-93 SOUTH RAMP EXISTING AM

LAST DATASETS LOADED OR SAVED
VOLUME=shisexam GEOMETRICS=shisexam
KEY: A- -B
:
C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: YIELD
PREVAILING SPEED: 40 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: Y

MINOR STREET LANES
APPROACH: C: I-93S ON
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: SOUTHAMP EB	B: SOUTHAMP WB	C: I-93S ON
LEFTS	0.00	0.00	0.00
THRUS	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00

APPROACH	A: SOUTHAMP EB			B: SOUTHAMP WB			C: I-93S ON		
	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	562	121	94	657	0	55	0	71
PHF	0.95			0.95			0.95		
ADJ VOLUME	0	592	127	99	692	0	58	0	75
PERCENT GRADE	0.00		.	0.00			0.00		
PASS CAR/HR	0			109			64	0	82

STEP 1 RIGHT TURNS FROM C:I-93S ON

CONFLICTING FLOWS	592
CRITICAL GAPS	4.2
CAPACITY	823
ACTUAL CAPACITY	823

STEP 2 LEFT TURNS FROM B:SOUTHAMP WB

CONFLICTING FLOWS	592
CRITICAL GAPS	4.7
CAPACITY	705
CAPACITY USED	15%
IMPEDANCE FACTOR	0.90
ACTUAL CAPACITY	705

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 2 of 2)
DATE:01-29-1991 TIME:10:44:22
SOUTHAMPTON AND I-93 SOUTH RAMP EXISTING AM

STEP 3 LEFT TURNS FROM C:I-93S ON

CONFLICTING FLOWS	1446
CRITICAL GAPS	6.6
CAPACITY	103
ACTUAL CAPACITY	93

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	109	705	596	A	6.04	0.18
LT FROM C:	64	93	29	E	124.66	3.77
RT FROM C:	82	823	741	A	4.86	0.09

```
CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)
DATE:03-01-1991              TIME:15:41:55
SOUTHAMPTON AND I-93 SOUTH RAMP 2000 NO-BUILD AM


LAST DATASETS LOADED OR SAVED
VOLUME=SH1SNBAM   GEOMETRICS=SH1SNBAM
KEY: A- -B
       !
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM C RT LANE: YIELD
PREVAILING SPEED:  40  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: Y

MINOR STREET LANES
APPROACH: C: I-93S ON
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO


SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: SOUTHAMP EB B: SOUTHAMP WB C: I-93S ON
LEFTS             0.00           0.00           0.00
THRUS             0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00


APPROACH        A: SOUTHAMP EB B: SOUTHAMP WB C: I-93S ON
                LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME           0  590  115  100  640    0    0    0    0
PHF             0.95           0.95           0.95
ADJ VOLUME       0  621  121  105  674    0    0    0    0
PERCENT GRADE   0.00           0.00           0.00
PASS CAR/HR      0            116              0    0    0


STEP 1 RIGHT TURNS FROM     C:I-93S ON
CONFLICTING FLOWS                      621
CRITICAL GAPS                          4.2
CAPACITY                               600
ACTUAL CAPACITY                        600


STEP 2 LEFT TURNS FROM     B:SOUTHAMP WB
CONFLICTING FLOWS                      621
CRITICAL GAPS                          4.7
CAPACITY                               683
CAPACITY USED                           17%
IMPEDANCE FACTOR                       0.88
ACTUAL CAPACITY                        683
```

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 2 of 2)
DATE:03-01-1991 TIME:15:41:55
SOUTHAMPTON AND I-93 SOUTH RAMP 2000 NO-BUILD AM

STEP 3 LEFT TURNS FROM C:I-93S ON

CONFLICTING FLOWS	1461
CRITICAL GAPS	6.6
CAPACITY	100
ACTUAL CAPACITY	89

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	116	683	568	A	6.34	0.20

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)
DATE:03-04-1991 TIME:09:29:42
SOUTHAMPTON AND I-93 SOUTH RAMP FUTURE BUILD [redacted] AM

LAST DATASETS LOADED OR SAVED
VOLUME=SHISB[redacted]AM GEOMETRICS=SHISB[redacted]AM
KEY: A- -6
!
C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250.000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: YIELD
PREVAILING SPEED: 40 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: Y

MINOR STREET LANES
APPROACH: C: I-93S ON
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: SOUTHAMP EB	B: SOUTHAMP WB	C: I-93S ON
LEFTS	0.00	0.00	0.00
THRUS	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00

APPROACH	A: SOUTHAMP EB			B: SOUTHAMP WB			C: I-93S ON		
	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	590	120	100	665	0	0	0	0
PHF	0.95			0.95			0.95		
ADJ VOLUME	0	621	126	105	700	0	0	0	0
PERCENT GRADE	0.00			0.00			0.00		
PASS CAR/HR	0			116			0	0	0

STEP 1 RIGHT TURNS FROM C:I-93S ON

CONFLICTING FLOWS	621
CRITICAL GAPS	4.2
CAPACITY	800
ACTUAL CAPACITY	800

STEP 2 LEFT TURNS FROM B:SOUTHAMP WB

CONFLICTING FLOWS	621
CRITICAL GAPS	4.7
CAPACITY	683
CAPACITY USED	17%
IMPEDANCE FACTOR	0.88
ACTUAL CAPACITY	683

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 2 of 2)
DATE:03-04-1991 TIME:09:29:42
SOUTHAMPTON AND I-93 SOUTH RAMP FUTURE BUILD [redacted] AM

STEP 3 LEFT TURNS FROM C:I-93S ON

CONFLICTING FLOWS	1489
CRITICAL GAPS	6.6
CAPACITY	95
ACTUAL CAPACITY	64

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	116	683	568	A	6.34	0.20

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)
DATE:01-29-1991 TIME:10:44:58
SOUTHAMPTON AND I-93 SOUTH RAMP EXISTING PM

LAST DATASETS LOADED OR SAVED
VOLUME=shisexom GEOMETRICS=shisexom
KEY: A- -B
!
C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: YIELD
PREVAILING SPEED: 40 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: Y

MINOR STREET LANES
APPROACH: C: I-93S ON
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: SOUTHAMP EB	B: SOUTHAMP WB	C: I-93S ON
LEFTS	0.00	0.00	0.00
THRUS	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00

APPROACH	A: SOUTHAMP EB			B: SOUTHAMP WB			C: I-93S ON		
	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	464	336	122	324	0	20	0	34
PHF	0.95			0.95			0.95		
ADJ VOLUME	0	488	354	128	341	0	21	0	36
PERCENT GRADE	0.00			0.00			0.00		
PASS CAR/HR	0			141			23	0	39

STEP 1 RIGHT TURNS FROM C:I-93S ON

CONFLICTING FLOWS	488
CRITICAL GAPS	4.2
CAPACITY	907
ACTUAL CAPACITY	907

STEP 2 LEFT TURNS FROM B:SOUTHAMP WB

CONFLICTING FLOWS	488
CRITICAL GAPS	4.7
CAPACITY	786
CAPACITY USED	18%
IMPEDANCE FACTOR	0.88
ACTUAL CAPACITY	786

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 2 of 2)
DATE:01-29-1991 TIME:10:44:58
SOUTHAMPTON AND I-93 SOUTH RAMP EXISTING PM

STEP 3 LEFT TURNS FROM C:I-93S ON

CONFLICTING FLOWS	1135
CRITICAL GAPS	6.6
CAPACITY	177
ACTUAL CAPACITY	155

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	141	786	645	A	5.59	0.22
LT FROM C:	23	155	132	D	27.31	1.07
RT FROM C:	39	907	868	A	4.15	0.03

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)
DATE:03-01-1991 TIME:15:43:12
SOUTHAMPTON AND I-93 SOUTH RAMP 2000 NO-BUILD PM

LAST DATASETS LOADED OR SAVED
VOLUME=SHISNBPM GEOMETRICS=SHISNBPM
KEY: A- -B
:
C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250.000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: YIELD
PREVAILING SPEED: 40 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: Y

MINOR STREET LANES
APPROACH: C: I-93S ON
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: SOUTHAMP EB	B: SOUTHAMP WB	C: I-93S ON
LEFTS	0.00	0.00	0.00
THRUS	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00

APPROACH	A: SOUTHAMP EB			B: SOUTHAMP WB			C: I-93S ON		
	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	495	365	120	275	0	0	0	0
PHF	0.95			0.95			0.95		
ADJ VOLUME	0	521	384	126	289	0	0	0	0
PERCENT GRADE	0.00			0.00			0.00		
PASS CAR/HR	0			139			0	0	0

STEP 1 RIGHT TURNS FROM C:I-93S ON

CONFLICTING FLOWS	521
CRITICAL GAPS	4.2
CAPACITY	880
ACTUAL CAPACITY	880

STEP 2 LEFT TURNS FROM B:SOUTHAMP WB

CONFLICTING FLOWS	521
CRITICAL GAPS	4.7
CAPACITY	760
CAPACITY USED	18%
IMPEDANCE FACTOR	0.87
ACTUAL CAPACITY	760

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 2 of 2)
DATE:03-01-1991 TIME:15:43:12
SOUTHAMPTON AND I-93 SOUTH RAMP 2000 NO-BUILD PM

STEP 3 LEFT TURNS FROM C:I-93S ON

CONFLICTING FLOWS	1129
CRITICAL GAPS	6.6
CAPACITY	179
ACTUAL CAPACITY	156

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	139	760	621	A	5.80	0.22

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 1 of 2)
DATE:03-04-1991 TIME:09:33:57
SOUTHAMPTON AND I-93 SOUTH RAMP FUTURE BUILD ~~[illegible]~~ PM

LAST DATASETS LOADED OR SAVED
VOLUME=SHISBP[illegible]M GEOMETRICS=SHISBP[illegible]M
KEY: A- -B
:
C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250.000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: YIELD
PREVAILING SPEED: 40 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: Y

MINOR STREET LANES
APPROACH: C: I-93S ON
SHARED LEFT AND RIGHT TURN LANE: NO
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: SOUTHAMP EB	B: SOUTHAMP WB	C: I-93S ON
LEFTS	0.00	0.00	0.00
THRUS	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00

APPROACH	A: SOUTHAMP EB			B: SOUTHAMP WB			C: I-93S ON		
	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	0	500	415	120	280	0	0	0	0
PHF	0.95			0.95			0.95		
ADJ VOLUME	0	526	437	126	295	0	0	0	0
PERCENT GRADE	0.00			0.00			0.00		
PASS CAR/HR	0			139			0	0	0

STEP 1 RIGHT TURNS FROM C:I-93S ON

CONFLICTING FLOWS	526
CRITICAL GAPS	4.2
CAPACITY	876
ACTUAL CAPACITY	876

STEP 2 LEFT TURNS FROM B:SOUTHAMP WB

CONFLICTING FLOWS	526
CRITICAL GAPS	4.7
CAPACITY	755
CAPACITY USED	18%
IMPEDANCE FACTOR	0.67
ACTUAL CAPACITY	755

1985 HCM - CHAPTER 10 : UNSIGNALIZED - 3 APPROACHES (PAGE 2 of 2)
DATE:03-04-1991 TIME:09:33:57
SOUTHAMPTON AND I-93 SOUTH RAMP FUTURE BUILD~~MITIGATED~~ PM

STEP 3 LEFT TURNS FROM C:I-93S ON

CONFLICTING FLOWS	1166
CRITICAL GAPS	6.6
CAPACITY	168
ACTUAL CAPACITY	147

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM B:	139	755	616	A	5.84	0.23

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:01-29-1991 TIME:10:48:38
SOUTHAMPTON AND I-93 NORTH RAMPS EXISTING AM

LAST DATASETS LOADED OR SAVED
VOLUME=shinexab GEOMETRICS=shinexab
KEY: D
:
A- -B
:
C

GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: YIELD
FROM D: STOP
FROM D RT LANE: YIELD
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: YES
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: YES

MINOR STREET LANES

APPROACH: C: I-93N OFF
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: I-93N ON
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: SOUTHAMP EB	B: SOUTHAMP WB	C: I-93N OFF	D: I-93N ON
LEFTS	0.00	0.00	0.00	0.00
THRUS	0.00	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00	0.00

APPROACH	A: SOUTHAMP EB			B: SOUTHAMP WB			C: I-93N OFF			D: I-93N ON		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	391	242	0	0	521	291	218	59	83	2	0	12
PHF	0.95			0.95			0.95			0.95		
ADJ VOLUME	412	255	0	0	548	306	229	62	87	2	0	13
PERCENT GRADE	0.00			0.00			0.00					
PASS CAR/HR	453			0			252	68	96	2	0	14

STEP 1 RIGHT TURNS FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	255	548
CRITICAL GAPS	4.0	4.0
CAPACITY	1176	913
CAPACITY USED	8%	2%
IMPEDANCE FACTOR	0.95	0.99
ACTUAL CAPACITY	1176	913

1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 2 OF 2)
DATE:01-29-1991 TIME:10:48:38
SOUTHAMPTON AND I-93 NORTH RAMPS EXISTING AM

STEP 2 LEFT TURNS FROM	B:SOUTHAMP WB	A:SOUTHAMP EB
CONFLICTING FLOWS	255	548
CRITICAL GAPS	4.5	4.5
CAPACITY	1041	783
CAPACITY USED	0%	58%
IMPEDANCE FACTOR	1.00	0.49
ACTUAL CAPACITY	1041	783

STEP 3 THRU MOVES FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	1215	1215
CRITICAL GAPS	5.5	5.5
CAPACITY	243	243
CAPACITY USED	28%	0%
IMPEDANCE FACTOR	0.79	1.00
ACTUAL CAPACITY	120	120

STEP 4 LEFT TURNS FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	1227	1364
CRITICAL GAPS	6.0	6.0
CAPACITY	193	156
ACTUAL CAPACITY	95	56

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	453	783	330	B	10.90	1.37
LT FROM C:	252	95	-157	F	INFINITE	INFINITE
TH FROM C:	68	120	52	E	69.29	1.31
RT FROM C:	96	1176	1080	A	3.33	0.09
LT FROM D:	2	58	55	E	64.90	0.04
RT FROM D:	14	913	899	A	4.00	0.02

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DINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:03-01-1991              TIME:15:15:33
SOUTHAMPTON AND I-93 NORTH RAMPS 2000 NO-BUILD AM


LAST DATASETS LOADED OR SAVED
VOLUME=SHINNBAM   GEOMETRICS=SHINNBAM
KEY:   D
       !
     A- -B
       !
       C
GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
          FROM C RT LANE: YIELD
          FROM D: STOP
          FROM D RT LANE: YIELD
PREVAILING SPEED:  30  MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: YES
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: YES

MINOR STREET LANES

APPROACH: C: I-93N OFF
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: I-93N ON
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)
APPROACH        A: SOUTHAMP EB B: SOUTHAMP WB C: I-93N OFF   D: I-93N ON
LEFTS             0.00           0.00           0.00           0.00
THRUS             0.00           0.00           0.00           0.00
RIGHTS            0.00           0.00           0.00           0.00


APPROACH        A: SOUTHAMP EB B: SOUTHAMP WB C: I-93N OFF   D: I-93N ON
                LT   TH   RT   LT   TH   RT   LT   TH   RT   LT   TH   RT
VOLUME          340  250   0    0  550  305  190   60   85   0    0    0
PHF               0.95           0.95           0.95           0.95
ADJ VOLUME      358  263   0    0  579  321  200   63   89   0    0    0
PERCENT GRADE     0.00           0.00           0.00
PASS CAR/HR     394              0            220   69   98   0    0    0


STEP 1 RIGHT TURNS FROM     C:I-93N OFF              D:I-93N ON
CONFLICTING FLOWS                  263                     579
CRITICAL GAPS                      4.0                     4.0
CAPACITY                          1168                    888
CAPACITY USED                       8%                      0%
IMPEDANCE FACTOR                  0.95                    1.00
ACTUAL CAPACITY                   1168                    888
```

1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 2 OF 2)
DATE:03-01-1991 TIME:15:15:33
SOUTHAMPTON AND I-93 NORTH RAMPS 2000 NO-BUILD AM

STEP 2 LEFT TURNS FROM	B:SOUTHAMP WB	A:SOUTHAMP EB
CONFLICTING FLOWS	263	579
CRITICAL GAPS	4.5	4.5
CAPACITY	1033	759
CAPACITY USED	0%	52%
IMPEDANCE FACTOR	1.00	0.56
ACTUAL CAPACITY	1033	759

STEP 3 THRU MOVES FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	1200	1200
CRITICAL GAPS	5.5	5.5
CAPACITY	248	248
CAPACITY USED	28%	0%
IMPEDANCE FACTOR	0.79	1.00
ACTUAL CAPACITY	138	138

STEP 4 LEFT TURNS FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	1200	1353
CRITICAL GAPS	6.0	6.0
CAPACITY	202	159
ACTUAL CAPACITY	112	66

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	394	759	366	B	9.85	1.08
LT FROM C:	220	112	-108	F	INFINITE	INFINITE
TH FROM C:	69	138	69	E	52.33	1.01
RT FROM C:	98	1168	1070	A	3.37	0.09

TINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:03-04-1991 TIME:09:41:46
SOUTHAMPTON AND I-93 NORTH RAMPS FUTURE BUILD [redacted] AM PEAK HOUR

LAST DATASETS LOADED OR SAVED
VOLUME=SHINB AM GEOMETRICS=SHINE AM

```
KEY:   D
       !
     A- -B
       !
       C
```

GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250.000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: YIELD
FROM D: STOP
FROM D RT LANE: YIELD
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: YES
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: YES

MINOR STREET LANES

APPROACH: C: I-93N OFF
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: I-93N ON
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: SOUTHAMP EB	B: SOUTHAMP WB	C: I-93N OFF	D: I-93N ON
LEFTS	0.00	0.00	0.00	0.00
THRUS	0.00	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00	0.00

APPROACH	A: SOUTHAMP EB			B: SOUTHAMP WB			C: I-93N OFF			D: I-93N ON		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	340	250	0	0	555	305	210	60	85	0	0	0
PHF	0.95			0.95			0.95			0.95		
ADJ VOLUME	358	263	0	0	584	321	221	63	89	0	0	0
PERCENT GRADE	0.00			0.00			0.00					
PASS CAR/HR	394			0			243	69	98	0	0	0

STEP 1 RIGHT TURNS FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	263	584
CRITICAL GAPS	4.0	4.0
CAPACITY	1168	664
CAPACITY USED	8%	0%
IMPEDANCE FACTOR	0.95	1.00
ACTUAL CAPACITY	1165	884

1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 2 OF 2)
DATE:03-04-1991 TIME:09:41:46
SOUTHAMPTON AND I-93 NORTH RAMPS FUTURE BUILD [redacted] AM

STEP 2 LEFT TURNS FROM	B:SOUTHAMP WB	A:SOUTHAMP EB
CONFLICTING FLOWS	263	584
CRITICAL GAPS	4.5	4.5
CAPACITY	1033	755
CAPACITY USED	0%	52%
IMPEDANCE FACTOR	1.00	0.55
ACTUAL CAPACITY	1033	755

STEP 3 THRU MOVES FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	1205	1205
CRITICAL GAPS	5.5	5.5
CAPACITY	246	246
CAPACITY USED	28%	0%
IMPEDANCE FACTOR	0.79	1.00
ACTUAL CAPACITY	137	137

STEP 4 LEFT TURNS FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	1205	1358
CRITICAL GAPS	6.0	6.0
CAPACITY	200	157
ACTUAL CAPACITY	111	65

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	394	755	361	B	9.96	1.09
LT FROM C:	243	111	-132	F	INFINITE	INFINITE
TH FROM C:	69	137	67	E	53.69	1.04
RT FROM C:	98	1168	1070	A	3.37	0.09

CINCH PROGRAM VERSION DATE 4-29-1986
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:01-29-1991 TIME:10:52:16
SOUTHAMPTON AND I-93 NORTH RAMPS EXISTING PM

LAST DATASETS LOADED OR SAVED
VOLUME=shinexom GEOMETRICS=shinexom
KEY: D
:
A- -B
:
C

GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250.000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: YIELD
FROM D: STOP
FROM D RT LANE: YIELD
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: YES
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: YES

MINOR STREET LANES

APPROACH: C: I-93N OFF
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: I-93N ON
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: SOUTHAMP EB	B: SOUTHAMP WB	C: I-93N OFF	D: I-93N ON
LEFTS	0.00	0.00	0.00	0.00
THRUS	0.00	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00	0.00

APPROACH	A: SOUTHAMP EB			B: SOUTHAMP WB			C: I-93N OFF			D: I-93N ON		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	213	285	0	0	383	150	56	15	65	1	0	7
PHF	0.95			0.95			0.95			0.95		
ADJ VOLUME	224	300	0	0	403	158	59	16	68	1	0	7
PERCENT GRADE	0.00			0.00			0.00					
PASS CAR/HR	247			0			65	17	75	1	0	8

STEP 1 RIGHT TURNS FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	300	403
CRITICAL GAPS	4.0	4.0
CAPACITY	1133	1038
CAPACITY USED	7%	1%
IMPEDANCE FACTOR	0.96	1.00
ACTUAL CAPACITY	1133	1038

1985 HCM - CHAPTER 10: UNSISNALIZED - 4 APPROACHES (PAGE 2 OF 2)
DATE:01-29-1991 TIME:10:52:16
SOUTHAMPTON AND I-93 NORTH RAMPS EXISTING PM

STEP 2 LEFT TURNS FROM	B:SOUTHAMP WB	A:SOUTHAMP EB
CONFLICTING FLOWS	300	403
CRITICAL GAPS	4.5	4.5
CAPACITY	998	904
CAPACITY USED	0%	27%
IMPEDANCE FACTOR	1.00	0.80
ACTUAL CAPACITY	998	904

STEP 3 THRU MOVES FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	927	927
CRITICAL GAPS	5.5	5.5
CAPACITY	362	362
CAPACITY USED	5%	0%
IMPEDANCE FACTOR	0.97	1.00
ACTUAL CAPACITY	288	288

STEP 4 LEFT TURNS FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	935	1012
CRITICAL GAPS	6.0	6.0
CAPACITY	301	269
ACTUAL CAPACITY	239	201

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	247	904	657	A	5.48	0.38
LT FROM C:	65	239	174	D	20.70	0.37
TH FROM C:	17	288	271	C	13.28	0.06
RT FROM C:	75	1133	1057	A	3.40	0.07
LT FROM D:	1	201	200	D	18.04	0.01
RT FROM D:	8	1038	1030	A	3.50	0.01

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:01-29-1991 TIME:16:30:07
SOUTHAMPTON AND I-93 NORTH RAMPS 2000 NO-BUILD PM

LAST DATASETS LOADED OR SAVED
VOLUME=SHINNBPM GEOMETRICS=SHINNBPM

```
KEY:   D
       :
     A- -B
       :
       C
```

GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: YIELD
FROM D: STOP
FROM D RT LANE: YIELD
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: YES
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: YES

MINOR STREET LANES

APPROACH: C: I-93N OFF
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: I-93N ON
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: SOUTHAMP EB	B: SOUTHAMP WB	C: I-93N OFF	D: I-93N ON
LEFTS	0.00	0.00	0.00	0.00
THRUS	0.00	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00	0.00

APPROACH	A: SOUTHAMP EB			B: SOUTHAMP WB			C: I-93N OFF			D: I-93N ON		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	190	305	0	0	330	160	70	15	70	0	0	0
PHF	0.95			0.95			0.95			0.95		
ADJ VOLUME	200	321	0	0	347	168	74	16	74	0	0	0
PERCENT GRADE	0.00			0.00			0.00					
PASS CAR/HR	220			0			81	17	81	0	0	0

STEP 1 RIGHT TURNS FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	321	347
CRITICAL GAPS	4.0	4.0
CAPACITY	1113	1068
CAPACITY USED	7%	0%
IMPEDANCE FACTOR	0.96	1.00
ACTUAL CAPACITY	1113	1068

1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 2 OF 2)
DATE:01-29-1991 TIME:16:30:07
SOUTHAMPTON AND I-93 NORTH RAMPS 2000 NO-BUILD PM

STEP 2 LEFT TURNS FROM	B:SOUTHAMP WB	A:SOUTHAMP EB
CONFLICTING FLOWS	321	347
CRITICAL GAPS	4.5	4.5
CAPACITY	978	954
CAPACITY USED	0%	23%
IMPEDANCE FACTOR	1.00	0.83
ACTUAL CAPACITY	978	954

STEP 3 THRU MOVES FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	868	868
CRITICAL GAPS	5.5	5.5
CAPACITY	392	392
CAPACITY USED	4%	0%
IMPEDANCE FACTOR	0.98	1.00
ACTUAL CAPACITY	327	327

STEP 4 LEFT TURNS FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	868	958
CRITICAL GAPS	6.0	6.0
CAPACITY	331	291
ACTUAL CAPACITY	276	227

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	220	954	734	A	4.91	0.30
LT FROM C:	81	276	195	D	18.47	0.42
TH FROM C:	17	327	309	B	11.64	0.06
RT FROM C:	81	1113	1032	A	3.49	0.08

CINCH PROGRAM VERSION DATE 4-29-1988
1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 1 OF 2)
DATE:03-04-1991 TIME:09:48:36
SOUTHAMPTON AND I-93 NORTH RAMPS FUTURE BUILD PM PEAK HOUR

LAST DATASETS LOADED OR SAVED
VOLUME=SHINE PM GEOMETRICS=SHINE PM
KEY: D
:
A- -B
:
C

GENERAL CHARACTERISTICS
POPULATION GREATER THAN 250,000: YES
CONTROLS: FROM C: STOP
FROM C RT LANE: YIELD
FROM D: STOP
FROM D RT LANE: YIELD
PREVAILING SPEED: 30 MPH
MAIN STREET # OF LANES: 2 LANES
MAIN STREET APPROACH A - EXCLUSIVE RIGHT TURN LANE: YES
MAIN STREET APPROACH B - EXCLUSIVE RIGHT TURN LANE: YES

MINOR STREET LANES

APPROACH: C: I-93N OFF
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

APPROACH: D: I-93N ON
EXCLUSIVE LEFT TURN LANES: YES
EXCLUSIVE RIGHT TURN LANES: YES
LARGE RIGHT TURN RADIUS OR SHALLOW RIGHT TURN ANGLE: YES
RIGHT TURN ACCELERATION LANE ON MAJOR: NO

SIGHT DISTANCE RESTRICTIONS (in seconds)

APPROACH	A: SOUTHAMP EB	B: SOUTHAMP WB	C: I-93N OFF	D: I-93N ON
LEFTS	0.00	0.00	0.00	0.00
THRUS	0.00	0.00	0.00	0.00
RIGHTS	0.00	0.00	0.00	0.00

APPROACH	A: SOUTHAMP EB			B: SOUTHAMP WB			C: I-93N OFF			D: I-93N ON		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
VOLUME	195	305	0	0	330	160	75	15	70	0	0	0
PHF	0.95			0.95			0.95			0.95		
ADJ VOLUME	205	321	0	0	347	168	79	16	74	0	0	0
PERCENT GRADE	0.00			0.00			0.00					
PASS CAR/HR	226			0			87	17	81	0	0	0

STEP 1 RIGHT TURNS FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	321	347
CRITICAL GAPS	4.0	4.0
CAPACITY	1113	1088
CAPACITY USED	7%	0%
IMPEDANCE FACTOR	0.96	1.00
ACTUAL CAPACITY	1113	1086

1985 HCM - CHAPTER 10: UNSIGNALIZED - 4 APPROACHES (PAGE 2 OF 2)
DATE:03-04-1991 TIME:09:48:36
SOUTHAMPTON AND I-93 NORTH RAMPS FUTURE BUILD [redacted] PM

STEP 2 LEFT TURNS FROM	B:SOUTHAMP WB	A:SOUTHAMP EB
CONFLICTING FLOWS	321	347
CRITICAL GAPS	4.5	4.5
CAPACITY	978	954
CAPACITY USED	0%	24%
IMPEDANCE FACTOR	1.00	0.83
ACTUAL CAPACITY	978	954

STEP 3 THRU MOVES FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	874	874
CRITICAL GAPS	5.5	5.5
CAPACITY	389	389
CAPACITY USED	4%	0%
IMPEDANCE FACTOR	0.98	1.00
ACTUAL CAPACITY	322	322

STEP 4 LEFT TURNS FROM	C:I-93N OFF	D:I-93N ON
CONFLICTING FLOWS	874	963
CRITICAL GAPS	6.0	6.0
CAPACITY	329	289
ACTUAL CAPACITY	272	224

SUMMARY OF LEVEL OF SERVICE BY MOVEMENT

MOVEMENT	DEMAND	CAPACITY	RESERVE	LOS	AVG DEL(SEC)	AVG QUEUE
LT FROM A:	226	954	728	A	4.94	0.31
LT FROM C:	87	272	185	D	19.43	0.47
TH FROM C:	17	322	305	B	11.81	0.06
RT FROM C:	81	1113	1032	A	3.49	0.06

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TITLE: PROGRAM  EPSILON  VER E  4-29-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MAGS AVE CONNECTOR AND BLOUNDRD STREET EXTENSION
BUILD MITIGATED AM PEAK HOUR
date:04-27-1991              time:09:00:41
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MCCERMAN   GEOMETRICS=MCCERMAN   SIGNAL=MCCERMAN
LOCATED IN CFDIN
VOLUME & GEOMETRICS
          VOLUMES        # OF LANES      LANE WIDTH      CROSS
DIR  LT   TH   RT      LT TH RT       LT   TH   RT      WALK
EB   40    0    5      0  1  0       0.0 12.0  0.0       0
WB    5    0   10      0  1  0       0.0 12.0  0.0       0
NB   20 1010   10      1  2  0      12.0 12.0  0.0       0
SB   30 1585  425      1  2  0      12.0 12.0  0.0       0

TRAFFIC & ROADWAY CONDITIONS
                  ADJ FACT                PEDESTRIANS        ARR
DIR GRADE %HV   Y N MOVES BUSES  PHF CROSS BUT MIN TIME TYPE
EB  0.0%  0.0%  N    0    0   .950    0          7.0    3
WB  0.0%  0.0%  N    0    0   .950    0          7.0    3
NB  0.0%  0.0%  N    0    0   .950    0          7.0    3
SB  0.0%  0.0%  N    0    0   .950    0          7.0    3

PHASINGS
   EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  Y+R PRE/ART
   l  t  r  p  l  t  r  p  l  t  r  p  l  t  r  p
 1 *  *  *     *  *  *                                10.0   3    A
 2                       *  *  *     *  *  *         54.0   3    A

CYCLE=  70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTFR THFR RTFR
EB    40    0    5  .950    42    0    5
WB     5    0   10  .950     5    0   11
NB    20 1010   10  .950    21 1063   11
SB    30 1585  425  .950    32 1668  447

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Plt  Prt
EB  LT-RT       47 1 1.00   47 0.39 0.11
WB  LT-RT       16 1 1.00   16 0.33 0.67
NB  LT          21 1 1.00   21 1.00 0.00
NB  TH-RT     1074 2 1.05 1127 0.00 0.01
SB  LT          32 1 1.00   32 1.00 0.00
SB  TH-RT     2116 2 1.05 2222 0.00 0.21

PART 3 (OPPOSING VOLUME ADJUSTMENTS)
LEFT TURN                OPPOSING APPROACH
BEING OPPOSED       VOLUMES      % OPPOSING LEFT TURN    # LANES     OPPOSING
                  LT   TH   RT        LT   TH   RT      LT  TH  RT    VOLUME
EASTBOUND          5    0   11       100  100  100       0   1   0      11
WESTBOUND         40    0    5       100  100  100       0   1   0       5
NORTHBOUND        32 1588  447       100  100  100       1   2   0    1795
SOUTHBOUND        21 1063   11       100  100  100       1   2   0    1074

SATURATION FLOW ADJUSTMENT WORKSHEET
DIR LN GROUP  IDEAL N  Fwid   Frv   Fgr Fpark  Fblk Fprel   Frt   Flt    s
EB  LT-RT     1800 1 1.000 1.000 1.000 1.000 1.000 1.000 0.999 1.000 1897
WB  LT-RT     1800 1 1.000 1.000 1.000 1.000 1.000 1.000 0.981 1.000 1859
NB  LT        1800 [illegible]
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CONCH PROGRAM VERSION DATE 4-18-1988
1985 HCM - CHAPTER 9: SIGNALIZED - OPERATIONAL ANALYSIS
MASS AVE CONNECTOR AND E.CONCORD STREET EXTENSION
BUILD MITIGATED PM PEAK HOUR
date:04-23-1991              time:09:02:40
LAST DATA SET NAMES LOADED OR SAVED
VOLUME=MCCEBMPM   GEOMETRICS=MCCEBMPM   SIGNAL=MCCEBMPM
LOCATED IN CBD:N
VOLUME & GEOMETRICS
        VOLUMES        # OF LANES      LANE WIDTH      CROSS
DIR  LT   TH   RT     LT TH RT       LT   TH   RT     WALK
EB  260    0   10      0  1  0      0.0 12.0  0.0      0
WB   10    0   20      0  1  0      0.0 12.0  0.0      0
NB    5 1275   10      1  2  0     12.0 12.0  0.0      0
SB   10 1690   65      1  2  0     12.0 12.0  0.0      0

TRAFFIC & ROADWAY CONDITIONS
                    ADJ PARK                PEDESTRIANS        ARR
DIR GRADE %HV    Y/N MOVES BUSES   PHF CROSS BUT MIN TIME T PE
EB  0.0%  0.0%    N     0     0   .950    0          7.0    3
WB  0.0%  0.0%    N     0     0   .950    0          7.0    3
NB  0.0%  0.0%    N     0     0   .950    0          7.0    3
SB  0.0%  0.0%    N     0     0   .950    0          7.0    3

PHASINGS
    EASTBOUND   WESTBOUND   NORTHBOUND  SOUTHBOUND GREEN  YYR PRE/ACT
    l  t  r  b  l  t  r  b  l  t  r  b  l  t  r  b
 1  *  *  *     *  *  *                                 16.2   3    A
 2                          *  *  *     *  *  *         47.5   3    A

CYCLE=  70.0

VOLUME ADJUSTMENT WORKSHEET
PART 1 (MOVEMENT ADJUSTMENTS)
DIR  LTV  THV  RTV   PHF  LTFR THFR RTFR
EB   260    0   10  .950   274    0   11
WB    10    0   20  .950    11    0   21
NB     5 1275   10  .950     5 1342   11
SB    10 1690   65  .950    11 1779   68

PART 2 (LANE GROUP ADJUSTMENTS)
DIR LN GROUP  FLOW N   LU    v  Flt  Prt
EB  LT-RT      284 1 1.00  284 0.96 0.04
WB  LT-RT       32 1 1.00   32 0.33 0.67
NB  LT           5 1 1.00    5 1.00 0.00
NB  TH-RT     1353 2 1.05 1420 0.00 0.01
SB  LT          11 1 1.00   11 1.00 0.00
SB  TH-RT     1547 2 1.05 1940 0.00 0.04

PART 3 (OPPOSING VOLUME ADJUSTMENTS)
LEFT TURN                 OPPOSING APPROACH
BEING OPPOSED       VOLUMES       % OPPOSING LEFT TURN     # LANES     OPPOSING
                 LT   TH   RT        LT   TH   RT        LT  TH  RT    VOLUME
EASTBOUND        11    0   21       100  100  100         0   1   0      21
WESTBOUND       274    0   11       100  100  100         0   1   0      11
NORTHBOUND       11 1779   68       100  100  100         1   2   0    1399
SOUTHBOUND        5 1342   11       100  100  100         1   2   0    1352

SATURATION FLOW ADJUSTMENT WORKSHEET
DIR LN GROUP  IDEAL N  Fwid   Fhv   Fpr Fpark  Fpug Farea   Prt   Plt    s
EB  LT-RT     1800  1 1.000 1.000 1.000 1.000 1.000 1.000 0.895 0.950 1578
WB  LT-RT     1800  1 1.000 1.000 1.000 1.000 1.000 1.000 0.810 1.999 1457
NB  LT          [illegible]
```

NB	TH-RT	1800	2	1.000	1.000	1.000	1.000	1.000	1.000	0.994	1.000	3596
SB	LT	1800	1	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.103	185
SB	TH-RT	1800	2	1.000	1.000	1.000	1.000	1.000	1.000	0.994	1.000	3580

SUPPLEMENTAL WORKSHEET FOR LEFT-TURN ADJUSTMENT FACTOR FLT

INPUT VARIABLES

DIR	C	G	N	Va	Vm	Vlt	Flt	No	Vo	Flto
EB	70	16	1	284	11	274	0.96	1	21	0.33
WB	70	16	1	32	21	11	0.33	1	11	0.96
NB	70	48	1	5	1353	5	1.00	2	1399	0.00
SB	70	48	1	11	1399	11	1.00	2	1353	0.00

CALCULATIONS

DIR	Soo	Yo	Gu	Fs	Fl	Gc	Ft	Gf	Ei	Fm	Flt
EB	1639	0.013	15.515	0.862	1.000	0.700	0.000	0.000	1.305	0.980	0.980
WB	1391	0.008	15.805	0.868	1.000	0.410	0.000	0.000	1.295	0.999	0.999
NB	3600	0.389	33.664	0.001	1.000	14.121	0.000	0.000	1800.000	0.084	0.084
SB	3600	0.376	34.414	0.030	1.000	13.371	0.000	0.000	38.000	0.103	0.103

CAPACITY ANALYSIS WORKSHEET

DIR	LN GROUP	v	s	v/s	g/C	c	v/c	CRITICAL
EB	LT-RT	284	1578	0.18	0.23	366	0.78	*
WB	LT-RT	32	1457	0.02	0.23	337	0.09	
NB	LT	5	151	0.03	0.68	103	0.05	
NB	TH-RT	1420	3596	0.39	0.68	2455	0.58	
SB	LT	11	185	0.06	0.68	126	0.08	
SB	TH-RT	1940	3580	0.54	0.68	2444	0.79	*

CYCLE= 70.0 LOST= 6.0 SUM V/S CRIT= 0.72 TOTAL V/C= 0.79

LEVEL OF SERVICE WORKSHEET

DIR	LN GROUP	v/c	g/C	C	d1	c	d2	PF	Delay	LOS	Avg Q	95% Q
EB	LT-RT	0.78	0.23	70.0	19.15	366	6.95	0.85	22.19	C	4.2	6
WB	LT-RT	0.09	0.23	70.0	16.05	337	0.00	0.85	13.65	B	0.5	1
NB	LT	0.05	0.68	70.0	2.78	103	0.00	0.85	2.36	A	0.0	1
NB	TH-RT	0.58	0.68	70.0	4.43	2455	0.26	0.85	3.98	A	8.3	8
SB	LT	0.08	0.68	70.0	2.84	126	0.01	0.85	2.42	A	0.1	1
SB	TH-RT	0.79	0.68	70.0	5.85	2444	1.33	0.85	6.10	B	11.4	11

DIR	Delay	LOS
EB	22.19	C
WB	13.65	B
NB	3.98	A
SB	6.08	B

INTERSECTION DELAY = 6.57 INTERSECTION LOS=B

THE CYCLE LENGTH WITHIN THE BOUNDS OF 70 TO 70 SECONDS
WHICH MINIMIZES CRITICAL MOVEMENT DELAY IS 70.0 SECONDS

FOR A V/C RATIO OF .95 THE CYCLE SHOULD BE 25.0 SECONDS
for chosen cycle length 70.0
suggested timing phase 1 is 16.0 secs green. 3.0 secs yellow + red clear
suggested timing phase 2 is 48.0 secs green. 3.0 secs yellow + red clear

C. PARKING

TABLE A-2 ON-STREET PARKING SUPPLY

Street/Block	Resident	Visitor	Meter	Unre-stricted	Handi-capped	Total
Northampton Street:						
Washington to Harrison				41		41
Harrison to Albany				38		38
Massachusetts Avenue:						
Washington to Harrison	42	4				46
Harrison to Albany			32			32
Albany to Melnea Cass						0
East Springfield Street:						
Washington to Harrison	55	10				65
Worchester Street:						
Washington to Harrison	48	6			2	56
East Concord Street:						
Washington to Harrison	35	14				49
Harrison to Albany			44			44
East Newton Street:						
Washington to James		24				24
Harrison to Albany	44	7		9		60
Washington Street:						
Northampton to Mass. Ave.				10		10
Mass. Ave to E. Concord				34		34
E. Concord to E. Newton				35		35
E. Newton to E. Brookline				30		30
James Street:						
E. Newton to E. Brookline				40		40
Harrison Avenue:						
Northampton to Mass. Ave				18		18
Mass. Ave to E. Concord			41			41
E. Concord to E. Newton			36			36
E. Newton to E. Brookline			24		4	28
Albany Street:						
Northampton to Mass. Ave.						0
Mass. Ave. to E. Newton			53			53
E. Newton to E. Brookline	–	–	–	–	–	0
Total	224	73	284	297	11	889

TABLE A-3 PROJECT-GENERATED PARKING DEMAND

Use	Size (KSF)*	Type	Parking Generation Rate	Net New Parking Demand
General Office	200	Work	2.17	434
		Non-work	0.56	113
		Subtotal	2.73	547
Retail	20	Work	1.00	20
		Non-work	0.49	10
		Subtotal	1.49	30
Medical Office	30	Work	1.80	54
		Non-work	2.66	80
		Subtotal	4.46	134
Hotel	250**	Work	0.21	53
		Non-work	0.32	79
		Subtotal	0.53	132
Research	240	Work	1.76	422
		Non-work	0.00	0
		Subtotal	1.76	422
Total Project		Work (long-term)		983
		Non-work (short-term)		282
		Total		1,265

* Net new space.
** Number of rooms.

D. PEDESTRIANS

Pedestrian Volume Counts:

1	Albany Street and East Brookline Street
2	Albany Street and East Newton Street
3	Albany Street and East Concord Street

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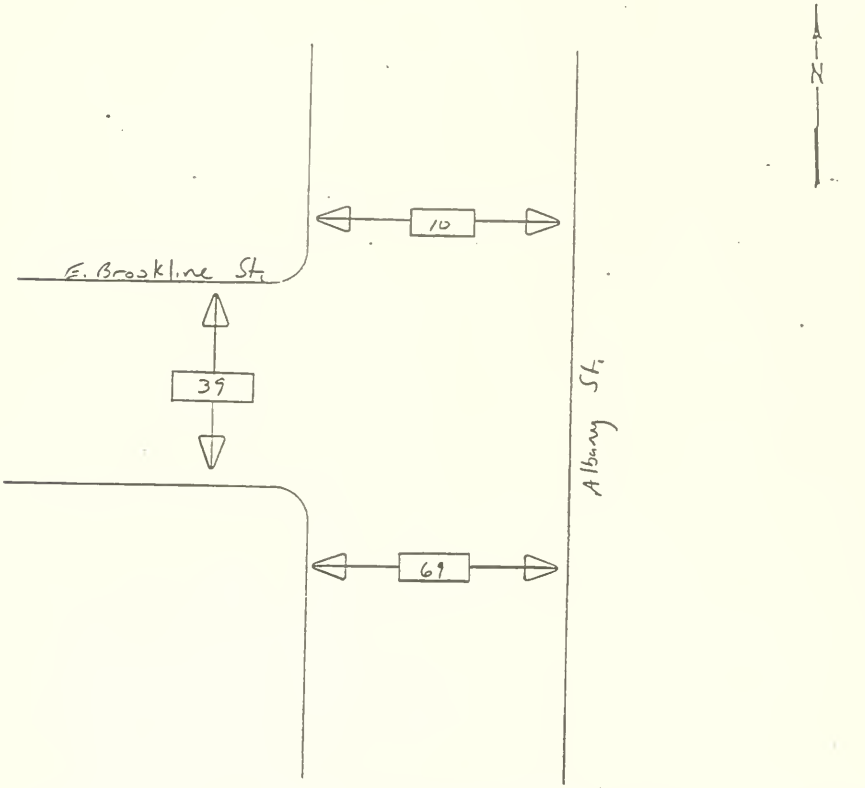
INTERSECTION ~~TURNING MOVEMENT~~ PEDESTRIAN COUNT

CITY Boston DATE 12/6/90 DAY of WEEK Thurs.
INTERSECTION E Brookline / Albany JOB No. 2825.12
CALCULATED BY: JMC



STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT = 7⁰⁰ – 9⁰⁰
Brookline	39	34 %	AM / PM PEAK HOUR: = 8⁰⁰ – 9⁰⁰
Albany N. Side	10	8 %	
Albany S. Side	69	58 %	P.H.F. = .76
			VEHICLES COUNTED
			ALL VEHICLES XXX —
			TRUCKS (XX) —
TOTAL	118	100 %	PERCENT TRUCKS — %

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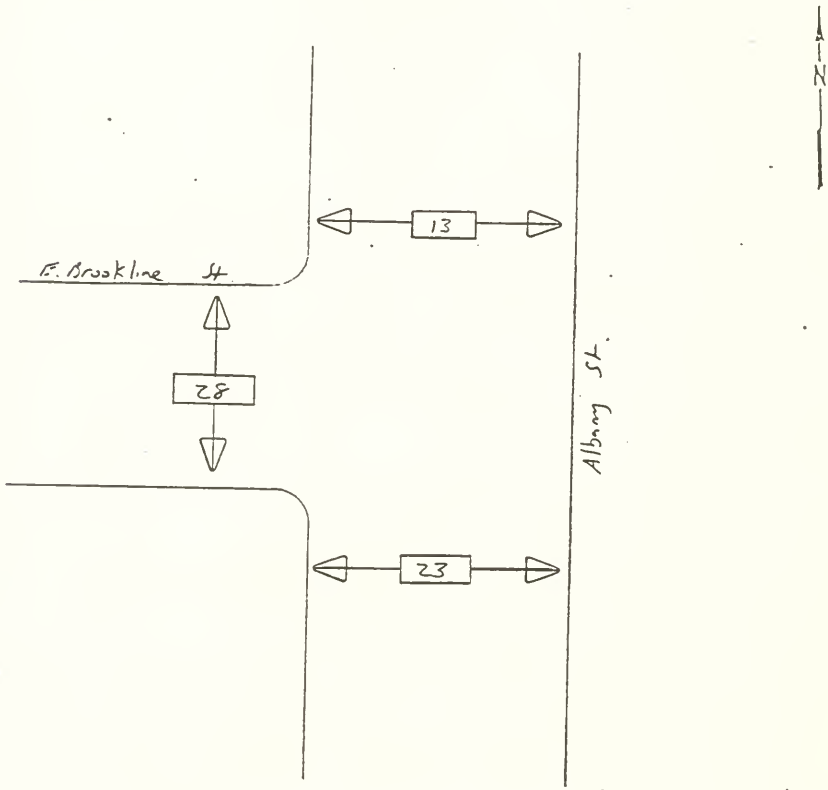
INTERSECTION ~~TURNING MOVEMENT~~ PEDESTRIAN COUNT

CITY Boston DATE 12/6/90 DAY of WEEK Thurs.
INTERSECTION E. Brookline / Albany JOB No. 2825 12
CALCULATED BY: J.M.C.



STREET	ENTERING VOLUME	PERCENT OF FLOW	
Brookline	28	44%	TIME of COUNT = 11⁰⁰ – 13⁰⁰
Albany N. Side	13	20 %	~~AM~~ MIDDAY ~~PM~~ PEAK HOUR: = 11⁴⁵ – 12⁴⁵
Albany S. Side	23	36 %	P.H.F. = .84
			VEHICLES COUNTED
			ALL VEHICLES XXX —
			TRUCKS (XX) —
TOTAL	64	100 %	PERCENT TRUCKS —%

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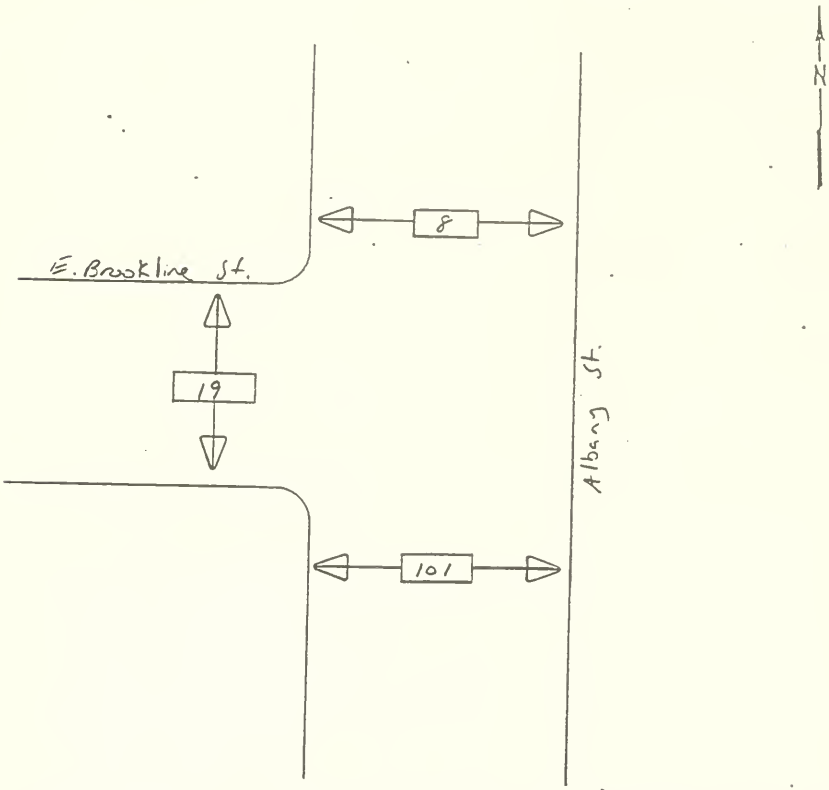
INTERSECTION ~~TURNING MOVEMENT~~ PEDESTRIAN COUNT

CITY Boston DATE 12/6/90 DAY of WEEK Thurs.
INTERSECTION E. Brookline / Albany JOB No. 2825.12
CALCULATED BY: Jim C.



STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT = 16⁰⁰ – 18⁰⁰
Brookline	19	15 %	AM PM PEAK HOUR: = 16¹⁵ – 17¹⁵
Albany N. Side	8	6 %	
Albany S. Side	101	79 %	P.H.F. = .80
			VEHICLES COUNTED
			ALL VEHICLES XXX —
			TRUCKS (XX) —
TOTAL	128	100 %	PERCENT TRUCKS — %

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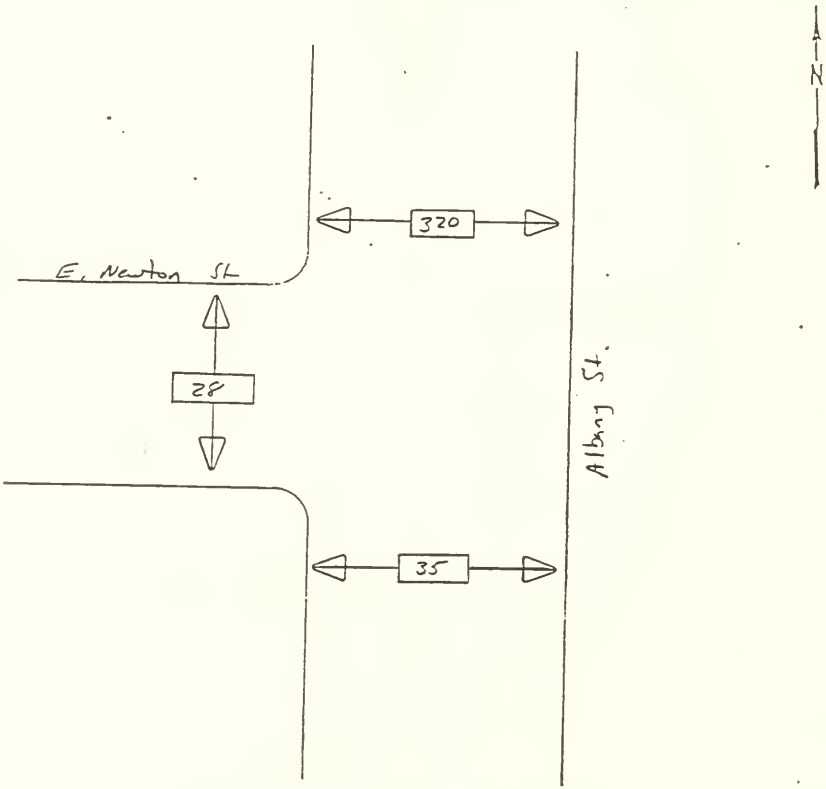
(2)

INTERSECTION ~~TURNING MOVEMENT~~ PEDESTRIAN COUNT

CITY Boston DATE 12/6/90 DAY of WEEK Thurs.
INTERSECTION E. Newton / Albany JOB No. 7825.12
CALCULATED BY: JmC.



STREET		ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT = 700 — 900
E. Newton		28	7%	AM / PM PEAK HOUR: = 730 — 830
Albany	N. Side	320	84%	
Albany	S. Side	35	9%	P.H.F. = .79
				VEHICLES COUNTED
				ALL VEHICLES XXX —
				TRUCKS (XX) —
TOTAL		383	100%	PERCENT TRUCKS — %

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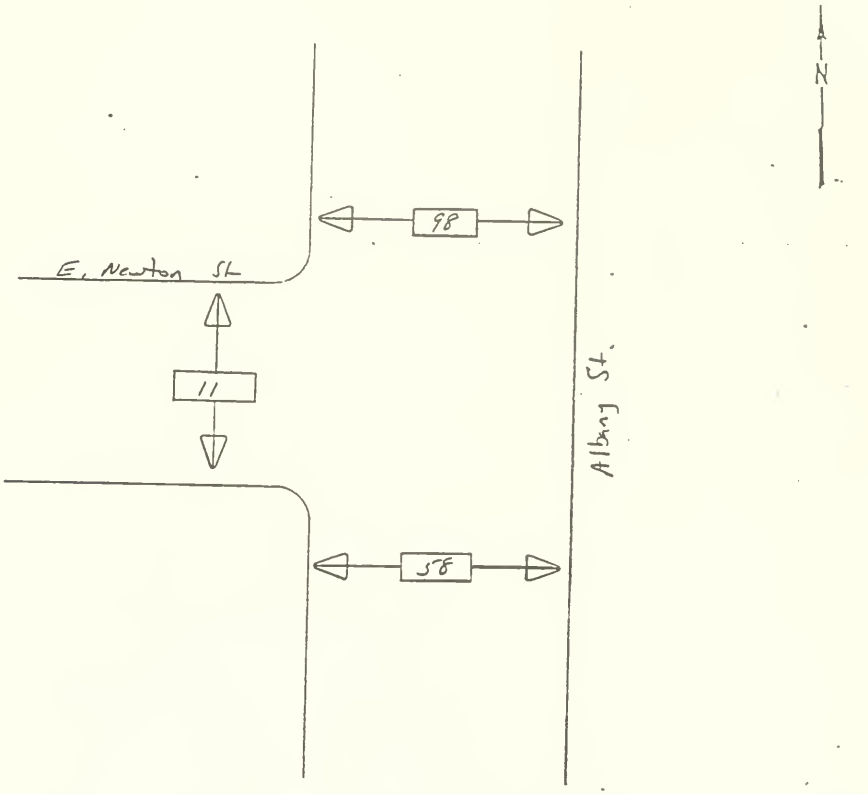
(2)

INTERSECTION ~~TURNING MOVEMENT~~ PEDESTRIAN COUNT

CITY Boston DATE 12/6/90 DAY of WEEK Thurs.

INTERSECTION E. Newton / Albany JOB No. 7825.12

CALCULATED BY: Jim C.



STREET		ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT = 11:00 — 13:00
E. Newton		11	7%	~~AM~~ ~~PM~~ MIDDAY PEAK HOUR: = 11:15 - 12:15
Albany	N. Side	98	59%	
Albany	S. Side	58	34%	P.H.F. = .70
				VEHICLES COUNTED
				ALL VEHICLES XXX —
				TRUCKS (XX) —
TOTAL		167	100%	PERCENT TRUCKS — %

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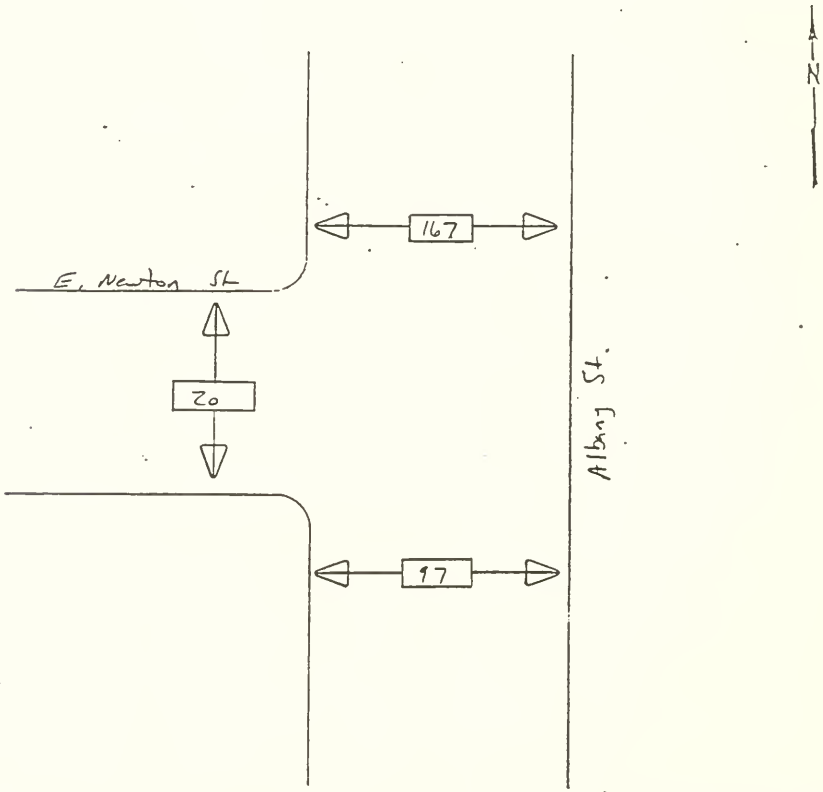
CITY Boston DATE 12/6/90 DAY of WEEK Thurs.
INTERSECTION E. Newton / Albany JOB No. 7825.12
CALCULATED BY: JMC.



STREET		ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT = 16⁰⁰ — 18⁰⁰
E. Newton		20	7%	AM (PM) PEAK HOUR: = 16¹⁵-17¹⁵
Albany	N. Side	167	59%	
Albany	S. Side	97	34%	P.H.F. = .95
				VEHICLES COUNTED
				ALL VEHICLES XXX —
				TRUCKS (XX) —
TOTAL		284	100%	PERCENT TRUCKS — %

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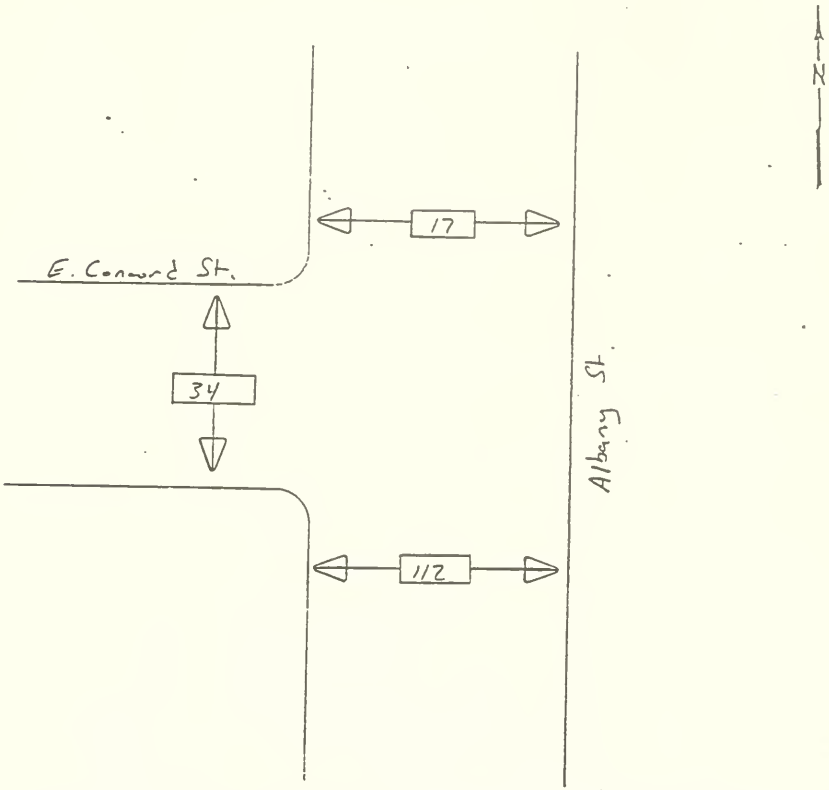
INTERSECTION ~~TURNING MOVEMENT~~ PEDESTRIAN COUNT

CITY Boston DATE 12/6/[illegible] DAY of WEEK Thurs.
INTERSECTION Albany / E. Concord JOB No. 2528.12
CALCULATED BY: J.m.C.



STREET		ENTERING VOLUME	PERCENT OF FLOW	
Concord		34	21 %	TIME of COUNT = 7⁰⁰ – 9⁰⁰
Albany	N. S. Le	17	10 %	(AM) PM PEAK HOUR: = 7³⁰ – 8³⁰
Albany	S. S. Le	112	69 %	P.H.F. = .80
				VEHICLES COUNTED
				ALL VEHICLES XXX —
				TRUCKS (XX) —
TOTAL		163	100 %	PERCENT TRUCKS — %

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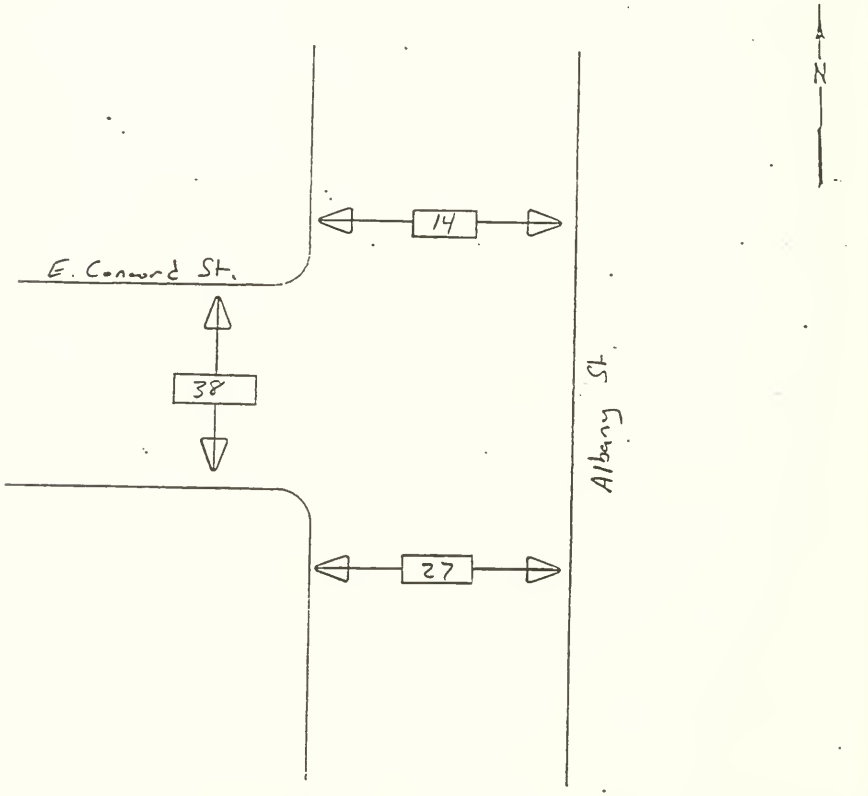
(3)

INTERSECTION ~~TURNING MOVEMENT~~ PEDESTRIAN COUNT

CITY Boston DATE 12/6/85 DAY of WEEK Thurs.
INTERSECTION Albany / E. Concord JOB No. 2528.12
CALCULATED BY: Jim C.



STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT = 11⁰⁰ – 13⁰⁰
Concord	38	48%	AM MIDDAY PM PEAK HOUR: = 11¹⁵ – 12¹⁵
Albany N. Side	14	18%	
Albany S. Side	27	34%	P.H.F. = .56
			VEHICLES COUNTED
			ALL VEHICLES XXX —
			TRUCKS (XX) —
TOTAL	79	100%	PERCENT TRUCKS — %

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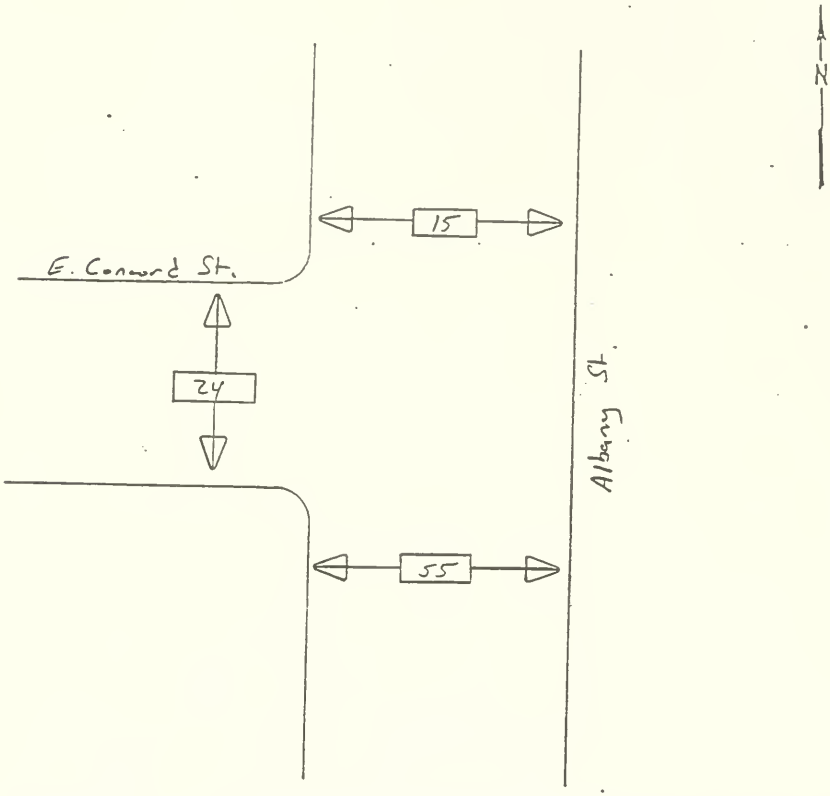
INTERSECTION ~~TURNING MOVEMENT~~ PEDESTRIAN COUNT

CITY Boston DATE 12/6/90 DAY of WEEK Thurs.
INTERSECTION Albany / E. Concord JOB No. 2528.12
CALCULATED BY: Jim C.



STREET	ENTERING VOLUME	PERCENT OF FLOW	TIME of COUNT = 16⁰⁰ – 18⁰⁰
Concord	24	26 %	AM (PM) PEAK HOUR: = 16⁰⁰ – 17⁰⁰
Albany N. Side	15	20 %	
Albany S. Side	55	54 %	P.H.F. = .94
			VEHICLES COUNTED
			ALL VEHICLES XXX —
			TRUCKS (XX) —
TOTAL	94	100 %	PERCENT TRUCKS — %

APPENDIX G

AIR QUALITY

APPENDIX A

DETAILED INFORMATION FOR THE MODELING ANALYSIS

TABLE A-1

HOURLY WEEKDAY TRAFFIC COUNTS IN THE VICINITY OF THE PROPOSED UNIVERSITY ASSOCIATES PROJECT - PEAK 8-HOUR PERIODS (NUMBER OF VEHICLES)

	(1)	(2)	(3)
	1048	1272	2182
	854	994	2214
	898	792	1940
	901	911	1856
	1036	962	1856
	1057	870	1981
	1160	966	2044
	892	1166	2078
Peak 8-hour average:	981	992	2019
Ratio of Peak 8-hour average to peak 1-hour average	0.85	0.78	0.91

Source: Vanasse, Hangen, Brustlin, Inc.

(1) Eastbound Mass. Ave. between Albany Street and Harrison Avenue, December 5, 6, 1990, 11 am - 6 pm.

(2) Albany Street North of E. Concord Street, December 5-7, 1990, 8 am - 3 pm.

(3) Melnea Cass Boulevard south of Mass. Ave., December 5-7, 1990, 7 am - 2 pm.

TABLE A-2

NATIONWIDE AVERAGE MOTOR VEHICLE MIX BY TYPE FOR THE YEAR 2000

Vehicle Type	Percent of VMT
Light-Duty Gasoline Vehicles	70.9
Light-Duty Gasoline Trucks	
0-6000 lb GVW* (LDGT1)	11.0
Over 6000 lb GVW (LDGT2)	8.1
Heavy-Duty Gasoline Vehicles (HDGV)	1.3
Light-Duty Diesel Vehicles (LDDV)	3.8
Light-Duty Diesel Trucks (LDDT)	1.6
Heavy-Duty Diesel Vehicles (HDDV)	2.3
Motorcycles (MC)	1.0
Total Percent	100.0

* Gross vehicle weight

TABLE A-3

COLD/HOT START VEHICLE MODES FOR THE MOBILE4 MODEL

	1-Hour	8-Hour
Cold Start	50.0%	20.6%
Hot Start	10.0%	27.3%
Hot Stabilized	40.0%	52.1%
Total	100.0%	100.0%

TABLE A-4

1985 MASSACHUSETTS VEHICLE AGE DISTRIBUTIONS (percent)

Age (Years)	LDGV, LDDV	LDGT1, LDGT2, LDDT	HDGV, HDDV
1	7.07	6.3	4.2
2	10.13	6.9	7.2
3	8.51	5.8	5.4
4	7.74	5.9	5.3
5	7.96	12.6	8.4
6	8.36	9.8	10.0
7	8.40	8.8	8.2
8	7.88	6.5	6.2
9	6.65	4.6	4.8
10	6.00	6.6	6.4
11	6.00	5.7	6.4
12	5.00	4.6	7.8
13	3.00	3.4	3.8
14	2.00	2.7	3.2
15	1.50	2.2	3.0
16	1.10	1.8	2.4
17	0.90	1.7	2.1
18	0.70	1.6	1.9
19	0.60	1.4	1.8
20+	0.50	1.1	1.5
Total	100.00	100.00	100.00

Source: Massachusetts Dept. of Environmental Protection

TABLE A-5

MOBILE4 COMPOSITE CO EMISSION RATES FOR THE YEAR 2000

Roadway Approaches		Approach Speed (mph)	Emissions (grams/mile)
Peak 1-hr Period			
#2	Albany Street	25	24.83
	Malden Street	25	24.83
#3	Albany Street	25	24.83
	E. Brookline Street	25	24.83
	Garage	15	33.80
#5	Albany Street	25	24.83
	E. Concord Street	25	24.83
	Garage	15	33.80
#8	Massachusetts Avenue	25	24.83
	Harrison Avenue	25	24.83
#9	Massachusetts Avenue	25	24.83
	Albany Street	25	24.83
#10	Massachusetts Avenue	25	24.83
	Melnea Cass Boulevard	30	20.68
	Mass. Ave. Connector	30	20.68
	Southampton Street	25	24.83
#12	Southampton Street	30	20.68
	Frontage Road/Ramps	25	24.83
	Site Garage Access*	15	33.80
	Albany Street	25	24.83

TABLE A-5 (continued)

Peak 8-hr Period

#2	Albany Street	30	12.52
	Malden Street	25	15.03
#3	Albany Street	30	12.52
	E. Brookline Street	25	15.03
	Garage	15	21.38
#5	Albany Street	30	12.52
	E. Concord Street	25	15.03
	Garage	15	21.38
#8	Massachusetts Avenue	30	12.52
	Harrison Avenue	25	15.03
#9	Massachusetts Avenue	30	12.52
	Albany Street	30	12.52
#10	Massachusetts Avenue	30	12.52
	Melnea Cass Boulevard	35	10.73
	Mass. Ave. Connector	35	10.73
	Southampton Street	30	12.52
#12	Southampton Street	35	10.73
	Frontage Road/Ramps	25	15.03
	Site Garage*	15	21.38
	Albany Street	30	12.52

* Site garage exit between E. Concord Street and E. Newton Street on east side of Albany Street.

TABLE A-6

IDLE EMISSION RATES FOR CO* FOR THE YEAR 2000

Time Period	grams/minute
Peak 1-Hour	5.57
Peak 8-Hour	3.55

*Idle emission rates are derived from the MOBILE4 emissions model. MOBILE4 idle emission rates represent hot-stabilized operating conditions, a temperature of 75°F, and a fuel volatility of 9.0 psi Reid Vapor Pressure (RVP). These idle emission rates were adjusted to the operating modes and conditions reported in this appendix (i.e., the operating modes listed in Table A-3, a temperature of 30°F, and a fuel volatility of 9.0 psi RVP) following EPA guidance.[1]

[1]Schewe, G. J., V. DiGirolamo, and R. Adams, Guideline for Modeling Carbon Monoxide from Roadway Intersections, U. S. EPA Office of Air Quality Planning and Standards, T. N. Braverman--Technical Representative, Research Triangle Park, October 1990.

TABLE A-7

INTERSECTION DATA FOR INTERSECTION #2 -
MALDEN STREET AND ALBANY STREET

Approach	No. of Lanes	Movements	Signal Phase
Malden Street	1	Left/Right	Stop Sign
Albany Street (NB)	2	Left/Thru	Free Flow
Albany Street (SB)	2	Right/Thru	Free Flow

TABLE A-8

INTERSECTION DATA FOR INTERSECTION #3 -
E. BROOKLINE STREET, ALBANY STREET AND SITE GARAGE

Approach	No. of Lanes	Movements	Signal Phase
E. Brookline Street	1	Left	Stop Sign
E. Brookline Street	1	Right	Stop Sign
Albany Street (NB)	2	All	Free Flow
Albany Street (SB)	2	All	Free Flow
Site Garage/Parking Lot	1	Left	Stop Sign
Site Garage/Parking Lot	1	Right	Stop Sign

TABLE A-9

INTERSECTION DATA FOR INTERSECTION #5 -
E. CONCORD STREET, ALBANY STREET AND SITE GARAGE

Approach	No. of Lanes	Movements	Control
E. Concord Street	1	Left	Stop Sign
E. Concord Street	1	Right	Stop Sign
Albany Street (NB)	1	All	Free Flow
Albany Street (SB)	1	All	Free Flow
Site Garage (Build)	1	Left	Stop Sign
Site Garage (Build)	1	Right	Stop Sign

TABLE A-10

INTERSECTION DATA FOR INTERSECTION #8 -
MASSACHUSETTS AVENUE AND HARRISON AVENUE

Approach	No. of Lanes	Movements	Signal Phase
Massachusetts Avenue (EB)	1	Left	A
Massachusetts Avenue (EB)	1	Thru	A + B
Massachusetts Avenue (EB)	1	Thru/Right	A + B
Massachusetts Avenue (WB)	1	Left	C
Massachusetts Avenue (WB)	1	Thru	B + C
Massachusetts Avenue (WB)	1	Thru/Right	B + C
Harrison Avenue (NB)	1	All	D
Harrison Avenue (SB)	1	Left	D
Harrison Avenue (SB)	1	Thru/Right	D

2000 Build Signal Timing (seconds):

Phase	Yellow and Green Time
A	10
B	30
C	40
D	30
Total	110

TABLE A-11

INTERSECTION DATA FOR INTERSECTION #9 -
MASSACHUSETTS AVENUE AND ALBANY STREET

Approach	No. of Lanes	Movements	Signal Phase
Massachusetts Avenue (EB)	1	Left	A + B
Massachusetts Avenue (EB)	1	Thru	B
Massachusetts Avenue (EB)	1	Thru/Right	B
Massachusetts Avenue (WB)	1	Left	A + B
Massachusetts Avenue (WB)	2	Thru	B
Massachusetts Avenue (WB)	1	Right	B
Albany Street (NB)	1	Left/Thru	C
Albany Street (NB)	1	Thru/Right	C
Albany Street (SB)	1	Left/Thru	C
Albany Street (SB)	1	Thru/Right	C

200 Build Signal Timing (seconds):

Phase	Yellow and Green Time
A	11
B	65
C	34
Total	110

TABLE A-12

INTERSECTION DATA FOR INTERSECTION #10 - MASSACHUSETTS AVENUE, SOUTHAMPTON STREET, MELNEA CASS BOULEVARD AND THE MASSACHUSETTS AVENUE CONNECTOR

Approach	No. of Lanes	Movements	Signal Phase
Massachusetts Avenue (EB)	2	Left	E
Massachusetts Avenue (EB)	1	Thru	E
Massachusetts Avenue (EB)	1	Thru/Right	E
Southhampton Street (WB)	1	Left	D
Southampton Street (WB)	3	Thru	D
Southampton Street (WB)	1	Right	Yield
Melnea Cass Boulevard (NB)	1	Left	A
Melnea Cass Boulevard (NB)	2	Thru	C
Melnea Cass Boulevard (NB)	1	Thru/Right	C
Mass. Avenue Connector (SB)	1	Left	A + B
Mass. Avenue Connector (SB)	2	Thru	B + C
Mass. Avenue Connector (SB)	1	Right	Yield

2000 Build Signal Timing (seconds):

Phase	Yellow and Green Time
A	10
B	5
C	37
D	28
E	30
Total	110

TABLE A-13

INTERSECTION DATA FOR INTERSECTION #12
SOUTHAMPTON STREET AND FRONTAGE ROAD

Approach	No. of Lanes	Movements	Control
Frontage Road Off-Ramp	2	Left/Thru	Stop Sign
Frontage Road Off-Ramp	1	Right	Yield
Southampton Street (EB)	2	Left/Thru	Free Flow
Southampton Street (WB)	2	Right/Thru	Free Flow

TABLE A-14

INTERSECTION DATA FOR INTERSECTION OF
SITE GARAGE* AND ALBANY STREET (BUILD CASE ONLY)

Approach	No. of Lanes	Movements	Control
Site Garage Exit	1	Left	Stop Sign
Site Garage Exit	1	Right	Stop Sign
Albany Street (NB)	2	Thru/Right	Free Flow
Albany Street (SB)	2	Left/Thru	Free Flow

*Access between E. Concord Street and E. Newton Street on the east side of Albany Street.

TABLE A-15

UNSIGNALIZED INTERSECTION CAPACITY--PEAK HOUR VOLUMES
(passenger cars per hour)

Intersection Traffic Movement	2000 No-Build	2000 Build
#2 Malden Street (and Albany Street)		
1-hour		
Left/Right	66	44
8-hour		
Left/Right	112	88
#3 E. Brookline Street (and Albany Street)		
1-hour		
Left/Thru	93	45
Right	765	745
8-hour		
Left/Thru	139	102
Right	825	820
#3 Garage (Build)/Parking Lot (No Build) (and Albany Street)		
1-hour		
Left	73	41
Right	615	550
8-hour		
Left	118	91
Right	675	625
#5 E. Concord Street (and Albany Street)		
1-hour		
left/Thru (Left only for No-Build)	175	119
Right	900	950
8-hour		
Left/Thru (left only for No-Build)	230	156
Right	925	980

TABLE A-15 (continued)

#5 Garage (and Albany Street)		
1-hour		
Left	-	109
Right	-	350
8-hour		
Left	-	157
Right	-	425
#12 Frontage Road (I-93) Ramp (and Southampton Street)		
1-hour		
Left	31	29
Thru	38	35
Right	1050	1050
8-hour		
Left	80	76
Thru	95	91
Right	1100	1100
Site Garage* (and Albany Street)		
1-hour		
Left	-	63
Right	-	395
8-hour		
Left	-	109
Right	-	465

* Access between E. Concord Street and E. Newton Street on the east side of Albany Street.

NOTE: See Appendix D for capacity calculation work sheets.

APPENDIX B

CAL3QHC MODEL OUTPUT

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BUILD PM 1-HOUR #2-MALDEN/ALBANY ST
DATE: 04/25/91
TIME: 09:07:16

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	2100.	24.8	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1720.	24.8	0.0	16.7		
3. MALDEN ST. FREE FLOW	2.3	0.0	-499.9	865.9	1001.	330.	AG	640.	24.8	0.0	13.3		
4. MALDEN STREET QUEUE	-3.8	10.7	-410.1	782.1	872.	332.	AG	896.	100.0	0.0	3.7	6.36	145.3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. #519 ALBANY ST.	-28.2	12.2	1.8
2. RETAIL STORE	-10.7	13.7	1.8
3. POLL CONTR. FACIL.	-3.0	37.3	1.8
4. CONTRACTOR OFFICE	23.6	-22.9	1.8
5. JACOBSON INC. REC.	-28.2	-19.8	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BUILD PM 1-HOUR #2-MALDEN/ALBANY ST

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5
0.	6.7	9.1	5.0	6.0	6.9
10.	6.5	8.7	5.0	6.0	6.8
20.	6.4	8.3	5.0	6.0	6.7
30.	6.4	8.0	5.0	6.0	6.6
40.	6.3	7.9	5.0	6.0	6.5
50.	6.3	7.9	5.0	6.1	6.3
60.	6.3	7.9	5.0	6.1	6.3
70.	6.4	8.1	5.0	6.2	6.2
80.	6.9	8.4	5.1	6.2	6.3
90.	7.4	9.0	5.4	5.8	5.9
100.	7.6	9.3	5.8	5.3	5.4
110.	7.3	9.0	5.8	5.1	5.1
120.	6.9	8.4	5.8	5.0	5.0
130.	6.6	7.7	5.8	5.0	5.0
140.	6.3	7.3	5.7	5.0	5.0
150.	6.1	6.8	5.7	5.0	5.0
160.	6.1	6.6	5.9	5.0	5.0
170.	6.1	6.4	6.2	5.0	5.0
180.	6.1	6.3	6.7	5.0	5.0
190.	6.1	6.1	7.1	5.0	5.0
200.	6.1	6.2	7.2	5.0	5.0
210.	6.2	6.2	7.3	5.0	5.0
220.	6.2	6.3	7.3	5.0	5.0
230.	6.4	6.3	7.3	5.0	5.0
240.	6.5	6.4	7.4	5.0	5.0
250.	6.7	6.5	7.4	5.1	5.1
260.	6.7	6.6	7.3	5.3	5.3
270.	6.3	6.2	7.2	5.7	5.7
280.	5.6	5.6	6.9	5.9	6.1
290.	5.2	5.3	6.9	6.0	6.1
300.	5.0	5.3	7.2	6.3	6.0
310.	5.1	6.0	7.4	6.9	6.0
320.	5.4	7.4	7.5	7.6	6.2
330.	6.3	9.1	7.1	7.8	6.7
340.	6.9	9.9	6.1	7.3	7.2
350.	6.9	9.6	5.3	6.3	7.3
360.	6.7	9.1	5.0	6.0	6.9
MAX	7.6	9.9	7.5	7.8	7.3
DEGR.	100	340	320	330	350

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BUILD PM 8-HOUR #2-MALDEN/ALBANY ST
DATE: 04/25/91
TIME: 09:23:37

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1785.	12.5	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1462.	12.5	0.0	16.7		
3. MALDEN ST. FREE FLOW	2.3	0.0	-499.9	865.9	1001.	330.	AG	544.	15.0	0.0	13.3		
4. MALDEN STREET QUEUE	-3.8	10.7	-280.3	535.8	593.	332.	AG	571.	100.0	0.0	3.7	2.70	98.9

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. #519 ALBANY ST.	-28.2	12.2	1.8
2. RETAIL STORE	-10.7	13.7	1.8
3. POLL CONTR. FACIL.	-3.0	37.3	1.8
4. CONTRACTOR OFFICE	23.6	-22.9	1.8
5. JACOBSON INC. REC.	-28.2	-19.8	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BUILD PM 8-HOUR #2-MALDEN/ALBANY ST

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5
0.	4.0	5.5	3.0	3.4	4.1
10.	4.0	5.2	3.0	3.4	4.0
20.	3.9	5.0	3.0	3.4	4.0
30.	3.9	4.9	3.0	3.4	3.8
40.	3.8	4.9	3.0	3.4	3.7
50.	3.8	4.8	3.0	3.5	3.7
60.	3.7	4.7	3.0	3.5	3.5
70.	3.8	4.8	3.0	3.5	3.5
80.	3.9	5.1	3.1	3.5	3.5
90.	4.1	5.3	3.2	3.3	3.4
100.	4.2	5.3	3.3	3.1	3.2
110.	4.0	5.1	3.4	3.0	3.0
120.	3.9	4.8	3.3	3.0	3.0
130.	3.6	4.4	3.3	3.0	3.0
140.	3.5	4.0	3.3	3.0	3.0
150.	3.5	3.9	3.3	3.0	3.0
160.	3.5	3.7	3.4	3.0	3.0
170.	3.5	3.5	3.7	3.0	3.0
180.	3.5	3.6	3.9	3.0	3.0
190.	3.5	3.5	4.1	3.0	3.0
200.	3.5	3.6	4.2	3.0	3.0
210.	3.5	3.5	4.3	3.0	3.0
220.	3.5	3.5	4.3	3.0	3.0
230.	3.6	3.5	4.3	3.0	3.0
240.	3.6	3.6	4.3	3.0	3.0
250.	3.7	3.6	4.3	3.0	3.0
260.	3.7	3.6	4.3	3.1	3.1
270.	3.5	3.5	4.3	3.3	3.3
280.	3.3	3.3	4.2	3.4	3.5
290.	3.1	3.2	4.2	3.4	3.5
300.	3.0	3.2	4.3	3.6	3.4
310.	3.0	3.5	4.5	3.9	3.4
320.	3.3	4.4	4.6	4.4	3.5
330.	3.8	5.5	4.2	4.6	3.8
340.	4.1	6.0	3.7	4.1	4.1
350.	4.1	5.8	3.2	3.6	4.2
360.	4.0	5.5	3.0	3.4	4.1
MAX	4.2	6.0	4.6	4.6	4.2
DEGR.	100	340	320	330	350

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD PM 1-HR #2 -MALDEN/ALBANY ST
DATE: 04/25/91
TIME: 09:19:54

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1945.	24.8	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1560.	24.8	0.0	16.7		
3. MALDEN ST. FREE FLOW	2.3	0.0	-499.9	865.9	1001.	330.	AG	635.	24.8	0.0	13.3		
4. MALDEN STREET QUEUE	-3.8	10.7	-377.4	720.1	802.	332.	AG	896.	100.0	0.0	3.7	4.24	133.6

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. #519 ALBANY ST.	-28.2	12.2	1.8
2. RETAIL STORE	-10.7	13.7	1.8
3. POLL CONTR. FACIL.	-3.0	37.3	1.8
4. CONTRACTOR OFFICE	23.6	-22.9	1.8
5. JACOBSON INC. REC.	-28.2	-19.8	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD PM 1-HR #2 -MALDEN/ALBANY ST

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5
0.	6.7	9.1	5.0	6.0	6.9
10.	6.5	8.6	5.0	5.9	6.8
20.	6.4	8.3	5.0	5.9	6.7
30.	6.4	8.0	5.0	5.9	6.6
40.	6.3	7.9	5.0	5.9	6.4
50.	6.3	7.9	5.0	6.0	6.3
60.	6.3	7.9	5.0	6.1	6.3
70.	6.4	8.1	5.0	6.1	6.2
80.	6.8	8.4	5.1	6.1	6.2
90.	7.3	8.9	5.4	5.7	5.8
100.	7.4	9.2	5.7	5.3	5.4
110.	7.1	8.8	5.8	5.1	5.1
120.	6.8	8.3	5.7	5.0	5.0
130.	6.5	7.6	5.7	5.0	5.0
140.	6.2	7.2	5.7	5.0	5.0
150.	6.0	6.7	5.7	5.0	5.0
160.	6.0	6.5	5.9	5.0	5.0
170.	6.0	6.3	6.2	5.0	5.0
180.	6.0	6.2	6.6	5.0	5.0
190.	6.0	6.0	7.0	5.0	5.0
200.	6.0	6.1	7.2	5.0	5.0
210.	6.0	6.1	7.2	5.0	5.0
220.	6.1	6.1	7.2	5.0	5.0
230.	6.2	6.1	7.3	5.0	5.0
240.	6.4	6.3	7.3	5.0	5.0
250.	6.5	6.4	7.3	5.1	5.1
260.	6.5	6.5	7.3	5.2	5.3
270.	6.2	6.1	7.1	5.6	5.7
280.	5.6	5.6	6.9	5.8	6.0
290.	5.2	5.2	6.9	5.9	6.0
300.	5.0	5.3	7.2	6.1	5.9
310.	5.1	5.9	7.4	6.8	5.9
320.	5.4	7.4	7.5	7.5	6.1
330.	6.3	9.1	7.1	7.8	6.6
340.	6.8	9.8	6.1	7.2	7.1
350.	6.9	9.6	5.3	6.3	7.2
360.	6.7	9.1	5.0	6.0	6.9
MAX	7.4	9.8	7.5	7.8	7.2
DEGR.	100	340	320	330	350

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD PM 8-HR #2 -MALDEN/ALBANY ST
DATE: 04/25/91
TIME: 09:24:49

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1653.	12.5	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1326.	12.5	0.0	16.7		
3. MALDEN ST. FREE FLOW	2.3	0.0	-499.9	865.9	1001.	330.	AG	540.	15.0	0.0	13.3		
4. MALDEN STREET QUEUE	-3.8	10.7	-245.0	468.8	518.	332.	AG	571.	100.0	0.0	3.7	2.13	86.3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. #519 ALBANY ST.	-28.2	12.2	1.8
2. RETAIL STORE	-10.7	13.7	1.8
3. POLL CONTR. FACIL.	-3.0	37.3	1.8
4. CONTRACTOR OFFICE	23.6	-22.9	1.8
5. JACOBSON INC. REC.	-28.2	-19.8	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD PM 8-HR #2 -MALDEN/ALBANY ST

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5
0.	4.0	5.5	3.0	3.4	4.0
10.	4.0	5.2	3.0	3.4	3.9
20.	3.9	5.0	3.0	3.4	3.9
30.	3.9	4.9	3.0	3.4	3.7
40.	3.8	4.9	3.0	3.4	3.7
50.	3.7	4.8	3.0	3.4	3.6
60.	3.7	4.7	3.0	3.5	3.5
70.	3.8	4.8	3.0	3.5	3.5
80.	3.9	5.1	3.1	3.5	3.5
90.	4.1	5.2	3.2	3.3	3.4
100.	4.0	5.3	3.3	3.1	3.2
110.	3.9	5.0	3.3	3.0	3.0
120.	3.7	4.7	3.3	3.0	3.0
130.	3.6	4.4	3.3	3.0	3.0
140.	3.5	4.0	3.3	3.0	3.0
150.	3.4	3.9	3.3	3.0	3.0
160.	3.4	3.6	3.4	3.0	3.0
170.	3.4	3.5	3.7	3.0	3.0
180.	3.4	3.5	3.9	3.0	3.0
190.	3.4	3.5	4.1	3.0	3.0
200.	3.4	3.5	4.2	3.0	3.0
210.	3.4	3.4	4.3	3.0	3.0
220.	3.5	3.4	4.3	3.0	3.0
230.	3.5	3.5	4.2	3.0	3.0
240.	3.6	3.5	4.3	3.0	3.0
250.	3.6	3.6	4.3	3.0	3.0
260.	3.7	3.6	4.2	3.1	3.1
270.	3.5	3.4	4.2	3.3	3.3
280.	3.2	3.3	4.1	3.4	3.4
290.	3.1	3.2	4.2	3.3	3.4
300.	3.0	3.2	4.3	3.6	3.4
310.	3.0	3.5	4.5	3.9	3.4
320.	3.3	4.4	4.5	4.4	3.4
330.	3.7	5.4	4.2	4.5	3.7
340.	4.0	5.9	3.6	4.1	4.0
350.	4.1	5.8	3.1	3.6	4.0
360.	4.0	5.5	3.0	3.4	4.0
MAX	4.1	5.9	4.5	4.5	4.0
DEGR.	90	340	310	330	0

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 1-HOUR #3 E.BROOKLINE/ALBANY
DATE: 04/25/91
TIME: 10:47:03

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1285.	24.8	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1425.	24.8	0.0	16.7		
3. E. BRKLINE FREE FLOW	-0.8	0.0	-0.8	499.9	500.	360.	AG	180.	24.8	0.0	12.9		
4. GARAGE EXT FREE FLOW	0.0	0.0	0.0	-499.9	500.	180.	AG	605.	33.8	0.0	15.1		
5. E. BROKLINE TL QUEUE	0.4	10.7	0.4	222.1	211.	360.	AG	896.	100.0	0.0	3.7	1.67	35.2
6. E. BROKLINE RT QUEUE	-3.0	10.7	-3.0	13.8	3.	360.	AG	280.	100.0	0.0	3.0	0.14	0.5
7. GARAGE LEFT TR QUEUE	0.0	-10.7	0.0	-16.4	6.	180.	AG	896.	100.0	0.0	3.0	0.49	1.0
8. GARAGE RIGHT QUEUE	3.0	-10.7	3.0	-13.8	3.	180.	AG	48.	100.0	0.0	3.0	0.03	0.5

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. RESEARCH LAB	-13.0	11.4	1.8
2. CONSTRUCTION	7.6	9.9	1.8
3. SEAST CORNER FUTURE	7.6	-10.7	1.8
4. SOUTH CORNER FUTURE	-7.6	-10.7	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 1-HOUR #3 E.BROOKLINE/ALBANY

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	6.2	7.2	8.0	8.0
10.	6.8	6.1	7.1	8.2
20.	7.0	5.3	6.3	7.8
30.	6.8	5.1	6.1	7.2
40.	6.7	5.0	6.0	6.9
50.	6.5	5.1	6.1	6.8
60.	6.5	5.1	6.2	6.9
70.	6.6	5.3	6.4	7.2
80.	6.8	5.7	6.5	7.5
90.	7.0	6.3	6.1	7.6
100.	7.0	6.6	5.6	7.2
110.	6.9	6.4	5.2	6.9
120.	6.6	6.3	5.1	6.7
130.	6.5	6.1	5.1	6.5
140.	6.7	6.0	5.1	6.3
150.	6.7	6.0	5.1	6.1
160.	6.8	6.1	5.3	6.1
170.	6.8	6.5	5.6	6.2
180.	6.6	6.9	6.0	6.0
190.	6.3	7.1	6.2	5.6
200.	6.1	7.1	6.2	5.3
210.	6.0	6.8	6.1	5.1
220.	6.1	6.7	6.3	5.1
230.	6.2	6.5	6.6	5.1
240.	6.3	6.6	6.8	5.1
250.	6.5	6.9	7.0	5.2
260.	6.5	7.3	7.3	5.7
270.	6.2	7.2	7.8	6.3
280.	5.6	7.0	7.6	6.6
290.	5.2	6.8	7.4	6.5
300.	5.1	6.9	7.0	6.3
310.	5.0	7.2	6.9	6.2
320.	5.0	7.4	7.0	6.1
330.	5.0	7.6	7.2	6.1
340.	5.1	7.8	7.8	6.4
350.	5.6	7.8	8.1	7.1
360.	6.2	7.2	8.0	8.0
MAX	7.0	7.8	8.1	8.2
DEGR.	20	340	350	10

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 8-HR #3 E.BROOKLINE/ALBANY
DATE: 04/25/91
TIME: 10:48:39

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1092.	12.5	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1211.	12.5	0.0	16.7		
3. E. BRKLINE FREE FLOW	-0.8	0.0	-0.8	499.9	500.	360.	AG	153.	12.5	0.0	12.9		
4. GARAGE EXT FREE FLOW	0.0	0.0	0.0	-499.9	500.	180.	AG	514.	21.4	0.0	15.1		
5. E. BROKLINE TL QUEUE	0.4	10.7	0.4	20.8	10.	360.	AG	571.	100.0	0.0	3.7	0.63	1.7
6. E. BROKLINE RT QUEUE	-3.0	10.7	-3.0	13.8	3.	360.	AG	133.	100.0	0.0	3.0	0.11	0.5
7. GARAGE LEFT QUEUE	0.0	-10.7	0.0	-13.8	3.	180.	AG	250.	100.0	0.0	3.0	0.19	0.5
8. GARAGE RIGHT QUEUE	3.0	-10.7	3.0	-13.8	3.	180.	AG	23.	100.0	0.0	3.0	0.02	0.5

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. RESEARCH LAB	-13.0	11.4	1.8
2. CONSTRUCTION	7.6	9.9	1.8
3. SEAST CORNER FUTURE	7.6	-10.7	1.8
4. SOUTH CORNER FUTURE	-7.6	-10.7	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 8-HR #3 E.BROOKLINE/ALBANY

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	3.0	3.2	3.8	3.8
10.	3.1	3.0	3.6	3.9
20.	3.1	3.0	3.4	4.0
30.	3.2	3.0	3.4	3.9
40.	3.3	3.0	3.4	3.8
50.	3.5	3.0	3.5	3.8
60.	3.5	3.0	3.5	3.8
70.	3.8	3.1	3.6	4.0
80.	3.9	3.3	3.6	4.0
90.	4.0	3.5	3.5	4.1
100.	4.0	3.7	3.3	3.7
110.	3.8	3.6	3.1	3.6
120.	3.7	3.5	3.0	3.5
130.	3.6	3.5	3.0	3.5
140.	3.6	3.4	3.0	3.4
150.	3.8	3.4	3.1	3.5
160.	3.7	3.5	3.2	3.6
170.	3.8	3.7	3.3	3.6
180.	3.7	3.8	3.6	3.6
190.	3.5	3.9	3.6	3.3
200.	3.4	3.8	3.6	3.1
210.	3.4	3.8	3.5	3.1
220.	3.5	3.7	3.4	3.0
230.	3.5	3.6	3.5	3.0
240.	3.6	3.6	3.5	3.0
250.	3.6	3.8	3.6	3.1
260.	3.6	4.1	3.8	3.3
270.	3.5	4.2	4.1	3.5
280.	3.3	4.2	4.1	3.7
290.	3.1	4.2	4.0	3.7
300.	3.0	4.1	3.8	3.6
310.	3.0	4.1	3.8	3.5
320.	3.0	4.0	3.9	3.5
330.	3.0	3.7	3.8	3.4
340.	3.0	3.5	4.0	3.4
350.	3.0	3.3	4.0	3.6
360.	3.0	3.2	3.8	3.8
MAX	4.0	4.2	4.1	4.1
DEGR.	90	270	280	90

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 1-HR #3 E.BROKLINE/ALBANY
DATE: 04/25/91
TIME: 10:50:38

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1250.	24.8	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1225.	24.8	0.0	16.7		
3. E. BRKLINE FREE FLOW	-0.8	0.0	-0.8	499.9	500.	360.	AG	180.	24.8	0.0	12.9		
4. PARKING LOT FRE FLOW	0.0	0.0	0.0	-499.9	500.	180.	AG	375.	33.8	0.0	15.1		
5. E. BROKLINE TL QUEUE	0.4	10.7	0.4	35.7	25.	360.	AG	896.	100.0	0.0	3.7	0.81	4.2
6. E. BROKLINE RT QUEUE	-3.0	10.7	-3.0	13.8	3.	360.	AG	272.	100.0	0.0	3.0	0.14	0.5
7. PARKING LOT LT QUEUE	0.0	-10.7	0.0	-13.8	3.	180.	AG	271.	100.0	0.0	3.0	0.14	0.5
8. PARKING LOT RT QUEUE	3.0	-10.7	3.0	-13.8	3.	180.	AG	14.	100.0	0.0	3.0	0.01	0.5

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. RESEARCH LAB	-13.0	11.4	1.8
2. CONSTRUCTION	7.6	9.9	1.8
3. SEAST CORNER FUTURE	7.6	-10.7	1.8
4. SOUTH CORNER FUTURE	-7.6	-10.7	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 1-HR #3 E.BROKLINE/ALBANY

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	5.2	5.8	6.9	6.9
10.	5.4	5.3	6.4	7.1
20.	5.7	5.0	6.1	6.9
30.	6.0	5.0	5.9	6.9
40.	6.2	5.0	6.0	6.6
50.	6.4	5.1	6.1	6.5
60.	6.5	5.1	6.2	6.6
70.	6.5	5.3	6.3	6.8
80.	6.8	5.7	6.4	6.8
90.	7.1	6.2	6.1	6.6
100.	7.0	6.5	5.6	6.2
110.	6.7	6.4	5.2	5.8
120.	6.4	6.2	5.1	5.6
130.	6.3	6.1	5.0	5.5
140.	6.2	6.0	5.0	5.5
150.	6.2	5.9	5.1	5.6
160.	6.3	6.0	5.2	5.6
170.	6.2	6.2	5.4	5.7
180.	6.1	6.4	5.6	5.6
190.	6.0	6.5	5.7	5.4
200.	5.8	6.4	5.7	5.2
210.	5.9	6.4	5.6	5.1
220.	5.9	6.3	5.5	5.0
230.	6.0	6.3	5.5	5.0
240.	6.1	6.5	5.6	5.1
250.	6.2	6.7	5.8	5.2
260.	6.3	7.1	6.1	5.6
270.	6.0	7.1	6.6	6.1
280.	5.5	6.9	6.8	6.4
290.	5.2	6.8	6.8	6.3
300.	5.0	6.9	6.6	6.2
310.	5.0	7.1	6.5	6.0
320.	5.0	7.2	6.6	5.9
330.	5.0	7.1	6.9	5.9
340.	5.0	6.8	6.9	6.1
350.	5.1	6.3	7.1	6.3
360.	5.2	5.8	6.9	6.9
MAX	7.1	7.2	7.1	7.1
DEGR.	90	320	350	10

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 8-HR #3 E.BROKLINE/ALBANY
DATE: 04/25/91
TIME: 10:53:02

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1063.	12.5	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1041.	12.5	0.0	16.7		
3. E. BRKLINE FREE FLOW	-0.8	0.0	-0.8	499.9	500.	360.	AG	153.	12.5	0.0	12.9		
4. PARKING LOT FRE FLOW	0.0	0.0	0.0	-499.9	500.	180.	AG	319.	21.4	0.0	15.1		
5. E. BROKLINE TL QUEUE	0.4	10.7	0.4	15.8	5.	360.	AG	571.	100.0	0.0	3.7	0.46	0.9
6. E. BROKLINE RT QUEUE	-3.0	10.7	-3.0	13.8	3.	360.	AG	132.	100.0	0.0	3.0	0.11	0.5
7. PARKING LOT LT QUEUE	0.0	-10.7	0.0	-13.8	3.	180.	AG	90.	100.0	0.0	3.0	0.08	0.5
8. PARKING LOT RT QUEUE	3.0	-10.7	3.0	-13.8	3.	180.	AG	8.	100.0	0.0	3.0	0.01	0.5

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. RESEARCH LAB	-13.0	11.4	1.8
2. CONSTRUCTION	7.6	9.9	1.8
3. SEAST CORNER FUTURE	7.6	-10.7	1.8
4. SOUTH CORNER FUTURE	-7.6	-10.7	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 8-HR #3 E.BROKLNE/ALBANY

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	3.0	3.1	3.7	3.7
10.	3.1	3.0	3.5	3.6
20.	3.1	3.0	3.4	3.8
30.	3.1	3.0	3.4	3.6
40.	3.1	3.0	3.4	3.7
50.	3.2	3.0	3.5	3.7
60.	3.2	3.0	3.5	3.7
70.	3.5	3.1	3.6	3.8
80.	3.7	3.3	3.6	3.8
90.	3.8	3.5	3.5	3.7
100.	4.0	3.6	3.3	3.5
110.	3.6	3.6	3.1	3.4
120.	3.7	3.5	3.0	3.3
130.	3.5	3.5	3.0	3.2
140.	3.5	3.4	3.0	3.3
150.	3.6	3.4	3.0	3.3
160.	3.5	3.5	3.1	3.3
170.	3.6	3.6	3.2	3.4
180.	3.6	3.7	3.3	3.3
190.	3.5	3.7	3.4	3.2
200.	3.4	3.6	3.4	3.1
210.	3.4	3.7	3.3	3.0
220.	3.4	3.5	3.3	3.0
230.	3.4	3.6	3.2	3.0
240.	3.5	3.5	3.3	3.0
250.	3.5	3.8	3.4	3.1
260.	3.6	4.0	3.5	3.2
270.	3.4	4.1	3.7	3.5
280.	3.2	4.1	3.8	3.6
290.	3.1	4.0	3.8	3.6
300.	3.0	3.8	3.7	3.5
310.	3.0	3.7	3.7	3.4
320.	3.0	3.5	3.7	3.4
330.	3.0	3.3	3.6	3.4
340.	3.0	3.2	3.8	3.4
350.	3.0	3.1	3.7	3.5
360.	3.0	3.1	3.7	3.7
MAX	4.0	4.1	3.8	3.8
DEGR.	100	270	280	20

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 1-HOUR #5 E.CONCORD/ALBANY
DATE: 04/25/91
TIME: 11:06:48

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S ZO = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1230.	24.8	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1560.	24.8	0.0	16.7		
3. E. CONCORD ST FR FLOW	-0.8	0.0	-0.8	499.9	500.	360.	AG	130.	24.8	0.0	12.9		
4. GARAGE EXT FREE FLOW	0.0	0.0	0.0	-499.9	500.	180.	AG	340.	33.8	0.0	15.1		
5. E. CONCORD T/L QUEUE	0.4	10.7	0.4	19.2	9.	360.	AG	896.	100.0	0.0	3.7	0.59	1.4
6. E. CONCORD RT QUEUE	-3.0	10.7	-3.0	13.8	3.	360.	AG	115.	100.0	0.0	3.0	0.06	0.5
7. GARAGE LEFT TR QUEUE	0.0	-10.7	0.0	-13.8	3.	180.	AG	509.	100.0	0.0	3.0	0.23	0.5
8. GARAGE RIGHT QUEUE	3.0	-10.7	3.0	-13.8	3.	180.	AG	0.	100.0	0.0	3.0	0.00	0.5

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. DOORWAY ALB. ST.	-19.8	12.2	1.8
2. BCH MATERNITY ENT.	-9.1	30.5	1.8
3. UNIVERS. HOSPITAL	8.4	26.7	1.8
4. UNIVERS. HOSPITAL	18.3	11.4	1.8
5. EAST CORNER FUTURE	7.6	-10.7	1.8
6. SOUTH CORNER FUTURE	-7.6	-10.7	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 ELE AM 1-HOUR #5 S.CONCORD/ALBANY

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5	REC6
0.	5.1	5.1	5.1	5.1	6.5	6.6
10.	5.1	5.2	5.1	5.0	6.1	6.7
20.	5.1	5.1	5.0	5.0	5.9	6.8
30.	5.1	5.1	5.0	5.0	5.9	6.7
40.	5.1	5.1	5.0	5.0	5.9	6.6
50.	5.2	5.1	5.0	5.0	6.0	6.5
60.	5.4	5.1	5.0	5.0	6.2	6.6
70.	5.6	5.1	5.0	5.2	6.3	6.7
80.	6.1	5.2	5.1	5.5	6.4	7.1
90.	6.6	5.4	5.4	6.0	6.1	6.8
100.	6.7	5.6	5.6	6.3	5.6	6.3
110.	6.7	5.8	5.6	6.3	5.2	6.0
120.	6.4	5.8	5.6	6.2	5.1	5.7
130.	6.3	6.0	5.6	6.2	5.2	5.6
140.	6.4	6.2	5.5	5.9	5.0	5.5
150.	6.4	6.2	5.5	5.9	5.1	5.5
160.	6.3	6.3	5.6	5.8	5.2	5.6
170.	6.3	6.3	5.7	5.8	5.3	5.7
180.	6.2	6.1	6.0	6.0	5.6	5.6
190.	6.1	5.8	6.3	6.1	5.7	5.3
200.	6.0	5.7	6.5	6.1	5.6	5.2
210.	6.0	5.6	6.7	6.3	5.5	5.1
220.	6.1	5.6	6.7	6.3	5.5	5.0
230.	6.2	5.6	6.5	6.3	5.6	5.0
240.	6.4	5.7	6.4	6.5	5.7	5.1
250.	6.5	5.7	6.1	6.8	5.9	5.3
260.	6.5	5.7	6.0	6.9	6.5	5.7
270.	6.2	5.4	5.6	6.9	7.1	6.4
280.	5.6	5.1	5.3	6.4	7.4	6.8
290.	5.2	5.0	5.1	5.8	7.0	6.7
300.	5.0	5.0	5.1	5.5	6.8	6.5
310.	5.0	5.0	5.1	5.3	6.6	6.3
320.	5.0	5.0	5.1	5.2	6.7	6.2
330.	5.0	5.0	5.1	5.2	6.7	6.2
340.	5.0	5.0	5.1	5.1	6.7	6.2
350.	5.0	5.1	5.1	5.1	6.6	6.4
360.	5.1	5.1	5.1	5.1	6.5	6.6
MAX	6.7	6.3	6.7	6.9	7.4	7.1
DEGR.	100	160	210	260	280	80

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 8-HOUR #5 E.CONCORD/ALBANY
DATE: 04/25/91
TIME: 11:16:34

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1046.	12.5	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1326.	12.5	0.0	16.7		
3. E. CONCORD ST FR FLO	-0.8	0.0	-0.8	499.9	500.	360.	AG	111.	12.5	0.0	12.9		
4. GARAGE EXT FREE FLOW	0.0	0.0	0.0	-499.9	500.	180.	AG	289.	21.4	0.0	15.1		
5. E. CONCORD T/L QUEUE	0.4	10.7	0.4	14.4	4.	360.	AG	570.	100.0	0.0	3.7	0.38	0.6
6. E. CONCORD RT QUEUE	-3.0	10.7	-3.0	13.8	3.	360.	AG	60.	100.0	0.0	3.0	0.05	0.5
7. GARAGE LEFT TR QUEUE	0.0	-10.7	0.0	-13.8	3.	180.	AG	168.	100.0	0.0	3.0	0.13	0.5
8. GARAGE RIGHT QUEUE	3.0	-10.7	3.0	-13.8	3.	180.	AG	0.	100.0	0.0	3.0	0.00	0.5

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. DOORWAY ALB. ST.	-19.8	12.2	1.8
2. BCH MATERNITY ENT.	-9.1	30.5	1.8
3. UNIVERS. HOSPITAL	8.4	26.7	1.8
4. UNIVERS. HOSPITAL	18.3	11.4	1.8
5. EAST CORNER FUTURE	7.6	-10.7	1.8
6. SOUTH CORNER FUTURE	-7.6	-10.7	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 8-HOUR #5 E.CONCORD/ALBANY

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5	REC6
0.	3.0	3.1	3.0	3.0	3.6	3.8
10.	3.0	3.1	3.0	3.0	3.4	3.7
20.	3.0	3.1	3.0	3.0	3.4	3.7
30.	3.0	3.1	3.0	3.0	3.4	3.7
40.	3.0	3.1	3.0	3.0	3.4	3.7
50.	3.0	3.0	3.0	3.0	3.4	3.7
60.	3.0	3.0	3.0	3.0	3.5	3.7
70.	3.2	3.0	3.0	3.1	3.6	3.8
80.	3.3	3.1	3.1	3.2	3.6	3.9
90.	3.6	3.1	3.2	3.4	3.5	3.7
100.	3.7	3.2	3.3	3.6	3.2	3.5
110.	3.6	3.2	3.3	3.5	3.1	3.4
120.	3.6	3.2	3.3	3.5	3.0	3.3
130.	3.6	3.3	3.2	3.4	3.0	3.3
140.	3.6	3.3	3.2	3.4	3.0	3.2
150.	3.5	3.5	3.2	3.4	3.0	3.3
160.	3.6	3.4	3.2	3.3	3.1	3.3
170.	3.6	3.6	3.3	3.4	3.2	3.4
180.	3.5	3.4	3.5	3.5	3.3	3.3
190.	3.4	3.3	3.5	3.5	3.4	3.2
200.	3.4	3.2	3.5	3.5	3.3	3.1
210.	3.4	3.2	3.6	3.4	3.3	3.0
220.	3.5	3.3	3.4	3.5	3.2	3.0
230.	3.5	3.3	3.4	3.6	3.3	3.0
240.	3.6	3.3	3.4	3.7	3.3	3.0
250.	3.6	3.3	3.3	3.7	3.4	3.1
260.	3.7	3.3	3.3	3.7	3.6	3.3
270.	3.5	3.2	3.2	3.8	3.8	3.6
280.	3.2	3.1	3.1	3.4	4.1	3.8
290.	3.1	3.0	3.0	3.2	3.9	3.7
300.	3.0	3.0	3.0	3.1	3.8	3.6
310.	3.0	3.0	3.0	3.0	3.8	3.6
320.	3.0	3.0	3.0	3.0	3.8	3.5
330.	3.0	3.0	3.1	3.0	3.6	3.5
340.	3.0	3.0	3.1	3.0	3.6	3.5
350.	3.0	3.0	3.1	3.0	3.6	3.5
360.	3.0	3.1	3.0	3.0	3.6	3.8
MAX	3.7	3.6	3.6	3.8	4.1	3.9
DEGR.	100	170	210	270	280	80

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 1-HR #5 E. CONCORD/ALBANY
DATE: 04/25/91
TIME: 11:20:46

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATTM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1205.	24.8	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1210.	24.8	0.0	16.7		
3. E. CONCORD ST FR FLC	-0.8	0.0	-0.8	499.9	500.	360.	AG	115.	24.8	0.0	12.9		
4. E. CONCORD T/L QUEUE	0.4	10.7	0.4	14.4	4.	360.	AG	656.	100.0	0.0	3.7	0.31	0.6
5. E. CONCORD RT QUEUE	-3.0	10.7	-3.0	13.8	3.	360.	AG	122.	100.0	0.0	3.0	0.07	0.5

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. DOORWAY ALB. ST.	-19.8	12.2	1.8
2. BCH MATERNITY ENT.	-9.1	30.5	1.8
3. UNIVERS. HOSPITAL	8.4	26.7	1.8
4. UNIVERS. HOSPITAL	18.3	11.4	1.8
5. EAST CORNER FUTURE	7.6	-10.7	1.8
6. SOUTH CORNER FUTURE	-7.6	-10.7	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 1-HR #5 E. CONCORD/ALBANY

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5	REC6
0.	5.0	5.1	5.1	5.0	6.0	6.0
10.	5.1	5.1	5.1	5.0	5.9	6.1
20.	5.1	5.1	5.0	5.0	5.8	6.1
30.	5.1	5.1	5.0	5.0	5.9	6.1
40.	5.1	5.1	5.0	5.0	5.9	6.0
50.	5.1	5.1	5.0	5.0	6.0	6.0
60.	5.1	5.1	5.0	5.0	6.1	6.2
70.	5.3	5.1	5.0	5.2	6.3	6.3
80.	5.7	5.2	5.1	5.5	6.4	6.3
90.	6.2	5.4	5.4	6.0	6.1	6.0
100.	6.4	5.6	5.6	6.3	5.6	5.5
110.	6.2	5.7	5.6	6.2	5.2	5.2
120.	6.1	5.6	5.6	6.1	5.1	5.0
130.	6.0	5.7	5.6	6.0	5.0	5.0
140.	5.9	5.6	5.5	5.9	5.0	5.0
150.	5.9	5.7	5.5	5.8	5.0	5.0
160.	5.7	5.7	5.5	5.8	5.0	5.0
170.	5.8	5.7	5.5	5.8	5.0	5.0
180.	5.8	5.6	5.6	5.8	5.0	5.0
190.	5.8	5.4	5.7	5.8	5.0	5.0
200.	5.8	5.4	5.8	5.8	5.0	5.0
210.	5.8	5.5	5.8	5.9	5.0	5.0
220.	5.9	5.5	5.8	6.0	5.0	5.0
230.	6.0	5.5	5.7	6.0	5.0	5.0
240.	6.1	5.5	5.8	6.1	5.0	5.1
250.	6.2	5.6	5.7	6.4	5.2	5.2
260.	6.2	5.5	5.7	6.5	5.5	5.6
270.	5.9	5.3	5.5	6.3	6.0	6.1
280.	5.4	5.1	5.2	5.8	6.3	6.4
290.	5.1	5.0	5.1	5.3	6.3	6.3
300.	5.0	5.0	5.1	5.2	6.2	6.1
310.	5.0	5.0	5.1	5.1	6.0	6.0
320.	5.0	5.0	5.1	5.1	6.0	5.9
330.	5.0	5.0	5.1	5.1	6.1	5.9
340.	5.0	5.0	5.1	5.1	6.1	5.8
350.	5.0	5.1	5.1	5.1	6.1	5.9
360.	5.0	5.1	5.1	5.0	6.0	6.0
MAX	6.4	5.7	5.8	6.5	6.4	6.4
DEGR.	100	110	200	260	80	280

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 8-HR #5 E. CONCORD/ALBANY
DATE: 04/25/91
TIME: 11:19:43

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1024.	12.5	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1029.	12.5	0.0	16.7		
3. E. CONCORD ST FR FLO	-0.8	0.0	-0.8	499.9	500.	360.	AG	98.	12.5	0.0	12.9		
4. E. CONCORD T/L QUEUE	0.4	10.7	0.4	14.4	4.	360.	AG	234.	100.0	0.0	3.7	0.20	0.6
5. E. CONCORD RT QUEUE	-3.0	10.7	-3.0	13.8	3.	360.	AG	64.	100.0	0.0	3.0	0.06	0.5

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. DOORWAY ALB. ST.	-19.8	12.2	1.8
2. BCH MATERNITY ENT.	-9.1	30.5	1.8
3. UNIVERS. HOSPITAL	8.4	26.7	1.8
4. UNIVERS. HOSPITAL	18.3	11.4	1.8
5. EAST CORNER FUTURE	7.6	-10.7	1.8
6. SOUTH CORNER FUTURE	-7.6	-10.7	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA

RUN: 2000 NO-BLD AM 8-HR #5 E. CONCORD/ALBANY

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5	REC6
0.	3.0	3.0	3.0	3.0	3.4	3.4
10.	3.0	3.1	3.0	3.0	3.4	3.3
20.	3.0	3.1	3.0	3.0	3.4	3.4
30.	3.0	3.1	3.0	3.0	3.4	3.4
40.	3.0	3.0	3.0	3.0	3.4	3.4
50.	3.0	3.0	3.0	3.0	3.4	3.4
60.	3.0	3.0	3.0	3.0	3.5	3.5
70.	3.1	3.0	3.0	3.1	3.6	3.6
80.	3.3	3.1	3.1	3.2	3.6	3.6
90.	3.5	3.1	3.2	3.4	3.5	3.4
100.	3.6	3.2	3.2	3.5	3.2	3.2
110.	3.5	3.2	3.3	3.5	3.1	3.1
120.	3.4	3.2	3.3	3.5	3.0	3.0
130.	3.4	3.2	3.2	3.4	3.0	3.0
140.	3.4	3.3	3.2	3.4	3.0	3.0
150.	3.3	3.2	3.2	3.4	3.0	3.0
160.	3.3	3.3	3.2	3.3	3.0	3.0
170.	3.3	3.2	3.2	3.3	3.0	3.0
180.	3.3	3.2	3.2	3.4	3.0	3.0
190.	3.3	3.2	3.3	3.3	3.0	3.0
200.	3.3	3.2	3.3	3.3	3.0	3.0
210.	3.3	3.2	3.4	3.3	3.0	3.0
220.	3.4	3.2	3.3	3.4	3.0	3.0
230.	3.4	3.2	3.3	3.4	3.0	3.0
240.	3.5	3.2	3.3	3.5	3.0	3.0
250.	3.5	3.2	3.3	3.5	3.1	3.1
260.	3.5	3.2	3.3	3.6	3.2	3.2
270.	3.4	3.1	3.2	3.6	3.4	3.5
280.	3.2	3.0	3.1	3.3	3.6	3.6
290.	3.1	3.0	3.0	3.2	3.6	3.6
300.	3.0	3.0	3.0	3.0	3.5	3.5
310.	3.0	3.0	3.0	3.0	3.4	3.4
320.	3.0	3.0	3.0	3.0	3.4	3.4
330.	3.0	3.0	3.0	3.0	3.4	3.4
340.	3.0	3.0	3.1	3.0	3.4	3.4
350.	3.0	3.0	3.1	3.0	3.3	3.4
360.	3.0	3.0	3.0	3.0	3.4	3.4
MAX	3.6	3.3	3.4	3.6	3.6	3.6
DEGR.	100	140	210	260	70	70

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 1-HOUR #8 MASS AVE/HARRISON
DATE: 05/01/91
TIME: 12:35:41

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. MASS AVE EAST FRE FL	0.8	0.0	0.8	-499.9	500.	180.	AG	2400.	24.8	0.0	24.3		
2. MASS AVE WEST FF	-0.8	0.0	-0.8	499.9	500.	360.	AG	2330.	24.8	0.0	21.2		
3. HARRISON AV NORTH FF	0.0	-1.1	499.9	-1.1	500.	90.	AG	920.	24.8	0.0	14.4		
4. HARRISON AV SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	690.	24.8	0.0	12.1		
5. MASS AVE EB T/R QUEU	-5.3	9.9	-5.3	57.4	47.	360.	AG	1125.	100.0	0.0	5.3	0.75	7.9
6. MASS AVE EB LT QUEUE	-1.1	9.9	-1.1	30.2	20.	360.	AG	815.	100.0	0.0	3.0	0.83	3.4
7. MASS AVE WB T/R QUEU	4.6	-13.0	4.6	-49.4	36.	180.	AG	668.	100.0	0.0	6.1	0.65	6.1
8. MASS AVE WB LT QUEUE	0.8	-13.0	0.8	-17.8	5.	180.	AG	570.	100.0	0.0	3.0	0.09	0.8
9. HARRISON AVE NB QUEU	-13.0	-1.5	-53.6	-1.5	41.	270.	AG	652.	100.0	0.0	3.0	0.75	6.8
10. HARISN AV SB LT QUEU	13.0	1.3	22.5	1.4	10.	90.	AG	652.	100.0	0.0	2.7	0.19	1.6
11. HARISON AV SB TR QUE	13.0	4.0	41.0	3.3	28.	91.	AG	652.	100.0	0.0	2.7	0.56	4.7

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. RESTAURANT	-13.7	9.1	1.8
2. RESIDENCE	15.2	14.5	1.8
3. BUS STOP SHELTER	13.0	-23.6	1.8
4. #860 HARRISON AVE	-24.4	-15.2	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 1-HOUR #8 MASS AVE/HARRISON

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	8.3	6.5	8.8	7.6
10.	9.8	5.7	7.5	8.5
20.	10.4	5.2	6.6	9.0
30.	10.7	5.0	6.3	8.7
40.	10.6	5.0	6.1	8.3
50.	10.4	5.0	6.0	7.7
60.	10.0	5.0	5.7	7.2
70.	9.5	5.1	5.6	7.3
80.	9.4	5.2	5.5	7.5
90.	9.4	5.6	5.3	7.2
100.	9.3	6.0	5.1	7.0
110.	8.6	6.3	5.1	7.0
120.	8.0	6.4	5.1	6.9
130.	8.1	6.7	5.2	6.8
140.	8.2	6.7	5.2	6.7
150.	8.5	7.0	5.3	6.6
160.	8.7	7.5	5.6	6.6
170.	8.9	8.0	6.5	6.4
180.	8.2	8.8	7.8	5.9
190.	7.2	9.3	8.6	5.4
200.	6.7	8.9	8.8	5.1
210.	6.6	8.1	8.8	5.0
220.	6.6	7.6	8.7	5.0
230.	6.7	7.6	8.5	5.0
240.	6.8	7.8	8.2	5.0
250.	6.6	8.3	8.1	5.0
260.	6.4	8.7	8.3	5.2
270.	5.9	8.9	8.8	5.4
280.	5.4	8.9	8.9	5.7
290.	5.1	8.7	9.0	5.9
300.	5.0	8.7	9.3	6.2
310.	5.1	8.6	9.4	6.2
320.	5.1	8.4	9.3	6.3
330.	5.1	8.1	9.5	6.3
340.	5.5	7.8	9.8	6.4
350.	6.5	7.3	9.8	6.8
360.	8.3	6.5	8.8	7.6
MAX	10.7	9.3	9.8	9.0
DEGR.	30	190	340	20

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 8-HOUR #8 MASS AVE/HARRISON
DATE: 05/01/91
TIME: 12:41:33

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. MASS AVE EAST FRE FL	0.8	0.0	0.8	-499.9	500.	180.	AG	2040.	12.5	0.0	24.3		
2. MASS AVE WEST FF	-0.8	0.0	-0.8	499.9	500.	360.	AG	1981.	12.5	0.0	21.2		
3. HARRISON AV NORTH FF	0.0	-1.1	499.9	-1.1	500.	90.	AG	782.	15.0	0.0	14.4		
4. HARRISON AV SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	587.	15.0	0.0	12.1		
5. MASS AVE EB T/R QUEU	-5.3	9.9	-5.3	48.1	38.	360.	AG	717.	100.0	0.0	5.3	0.64	6.4
6. MASS AVE EB LT QUEUE	-1.1	9.9	-1.1	25.1	15.	360.	AG	519.	100.0	0.0	3.0	0.70	2.5
7. MASS AVE WB T/R QUEU	4.6	-13.0	4.6	-42.5	30.	180.	AG	426.	100.0	0.0	6.1	0.56	4.9
8. MASS AVE WB LT QUEUE	0.8	-13.0	0.8	-17.1	4.	180.	AG	364.	100.0	0.0	3.0	0.07	0.7
9. HARRISON AVE NB QUEU	-13.0	-1.5	-45.7	-1.5	33.	270.	AG	416.	100.0	0.0	3.0	0.64	5.5
10. HARISN AV SB LT QUEU	13.0	1.3	21.1	1.3	8.	90.	AG	416.	100.0	0.0	2.7	0.17	1.4
11. HARISN AV SB T/R QUE	13.0	4.0	36.4	3.4	23.	91.	AG	416.	100.0	0.0	2.7	0.47	3.9

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. RESTAURANT	-13.7	9.1	1.8
2. RESIDENCE	15.2	14.5	1.8
3. BUS STOP SHELTER	13.0	-23.6	1.8
4. #860 HARRISON AVE	-24.4	-15.2	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA

RUN: 2000 BLD AM 8-HOUR #8 MASS AVE/HARRISON

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	4.5	3.6	4.8	4.4
10.	5.3	3.3	4.2	4.8
20.	5.7	3.1	3.8	5.0
30.	6.0	3.0	3.7	5.0
40.	6.1	3.0	3.5	4.6
50.	5.9	3.0	3.4	4.4
60.	5.8	3.0	3.2	4.3
70.	5.7	3.0	3.3	4.3
80.	5.5	3.1	3.3	4.2
90.	5.2	3.2	3.2	4.3
100.	5.2	3.4	3.1	4.1
110.	4.7	3.6	3.0	3.9
120.	4.4	3.7	3.1	3.9
130.	4.4	3.9	3.1	3.8
140.	4.5	4.0	3.1	3.8
150.	4.7	4.1	3.1	3.7
160.	4.7	4.3	3.3	3.6
170.	4.6	4.6	3.6	3.6
180.	4.6	5.0	4.1	3.4
190.	4.1	5.3	4.5	3.2
200.	3.9	4.9	4.7	3.0
210.	4.0	4.4	4.8	3.0
220.	4.0	4.2	4.9	3.0
230.	4.0	4.1	4.8	3.0
240.	3.9	4.4	4.7	3.0
250.	3.9	4.7	4.7	3.0
260.	3.7	4.9	4.7	3.1
270.	3.4	5.1	4.9	3.2
280.	3.2	5.0	5.1	3.3
290.	3.1	5.0	5.2	3.4
300.	3.0	4.9	5.2	3.5
310.	3.0	4.7	5.1	3.6
320.	3.0	4.6	5.4	3.7
330.	3.1	4.3	5.3	3.7
340.	3.3	4.2	5.1	3.7
350.	3.7	4.0	5.3	4.0
360.	4.5	3.6	4.8	4.4
MAX	6.1	5.3	5.4	5.0
DEGR.	40	190	320	20

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 1-HR #8 MASS AVE/HARISON
DATE: 05/01/91
TIME: 12:40:45

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. MASS AVE EAST FRE FL	0.8	0.0	0.8	-499.9	500.	180.	AG	2360.	24.8	0.0	24.3		
2. MASS AVE WEST FF	-0.8	0.0	-0.8	499.9	500.	360.	AG	2275.	24.8	0.0	21.2		
3. HARRISON AV NORTH FF	0.0	-1.1	499.9	-1.1	500.	90.	AG	905.	24.8	0.0	14.4		
4. HARRISON AV SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	690.	24.8	0.0	12.1		
5. MASS AVE EB T/R QUEU	-5.3	9.9	-5.3	56.2	46.	360.	AG	1141.	100.0	0.0	5.3	0.75	7.7
6. MASS AVE EB LT QUEUE	-1.1	9.9	-1.1	27.2	17.	360.	AG	823.	100.0	0.0	3.0	0.81	2.9
7. MASS AVE WB T/R QUEU	4.6	-13.0	4.6	-48.0	35.	180.	AG	652.	100.0	0.0	6.1	0.64	5.8
8. MASS AVE WB LT QUEUE	0.8	-13.0	0.8	-17.8	5.	180.	AG	570.	100.0	0.0	3.0	0.09	0.8
9. HARRISON AVE NB QUEU	-13.0	-1.5	-52.4	-1.5	39.	270.	AG	644.	100.0	0.0	3.0	0.73	6.6
10. HARISN AVE SB LT QUE	13.0	1.3	22.3	1.4	9.	90.	AG	644.	100.0	0.0	2.7	0.19	1.6
11. HARISN AV SB T/R QUE	13.0	4.0	40.4	3.3	27.	91.	AG	644.	100.0	0.0	2.7	0.54	4.6

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. RESTAURANT	-13.7	9.1	1.8
2. RESIDENCE	15.2	14.5	1.8
3. BUS STOP SHELTER	13.0	-23.6	1.8
4. #860 HARRISON AVE	-24.4	-15.2	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA

RUN: 2000 NO-BLD AM 1-HR #8 MASS AVE/HARISON

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	8.1	6.5	8.7	7.6
10.	9.6	5.7	7.5	8.4
20.	10.3	5.2	6.6	8.7
30.	10.6	5.0	6.3	8.6
40.	10.5	5.0	6.1	8.1
50.	10.3	5.0	5.8	7.7
60.	10.0	5.0	5.7	7.2
70.	9.5	5.1	5.6	7.3
80.	9.4	5.2	5.5	7.5
90.	9.3	5.6	5.3	7.2
100.	9.1	6.0	5.1	7.0
110.	8.4	6.2	5.1	6.9
120.	8.0	6.4	5.1	6.8
130.	8.1	6.7	5.2	6.8
140.	8.1	6.7	5.2	6.7
150.	8.4	6.9	5.3	6.6
160.	8.7	7.3	5.6	6.5
170.	8.8	7.9	6.5	6.3
180.	8.1	8.7	7.8	5.9
190.	7.2	9.3	8.5	5.4
200.	6.7	8.6	8.7	5.1
210.	6.6	8.1	8.7	5.0
220.	6.6	7.6	8.6	5.0
230.	6.7	7.6	8.4	5.0
240.	6.8	7.8	8.2	5.0
250.	6.6	8.3	8.1	5.0
260.	6.4	8.6	8.3	5.2
270.	5.9	8.9	8.6	5.4
280.	5.4	8.8	8.7	5.7
290.	5.1	8.5	9.0	5.9
300.	5.0	8.6	9.0	6.1
310.	5.1	8.5	9.3	6.2
320.	5.1	8.3	9.2	6.3
330.	5.1	8.0	9.3	6.3
340.	5.5	7.7	9.7	6.4
350.	6.5	7.3	9.4	6.8
360.	8.1	6.5	8.7	7.6
MAX	10.6	9.3	9.7	8.7
DEGR.	30	190	340	20

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 8-HR #8 MASS AVE/HARISON
DATE: 05/01/91
TIME: 12:40:10

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. MASS AVE EAST FRE FL	0.8	0.0	0.8	-499.9	500.	180.	AG	2006.	12.5	0.0	24.3		
2. MASS AVE WEST FF	-0.8	0.0	-0.8	499.9	500.	360.	AG	1934.	12.5	0.0	21.2		
3. HARRISON AV NORTH FF	0.0	-1.1	499.9	-1.1	500.	90.	AG	769.	15.0	0.0	14.4		
4. HARRISON AV SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	587.	15.0	0.0	12.1		
5. MASS AVE EB T/R QUEU	-5.3	9.9	-5.3	47.2	37.	360.	AG	727.	100.0	0.0	5.3	0.63	6.2
6. MASS AVE EB LT QUEUE	-1.1	9.9	-1.1	23.1	13.	360.	AG	525.	100.0	0.0	3.0	0.69	2.2
7. MASS AVE WB T/R QUEU	4.6	-13.0	4.6	-41.4	28.	180.	AG	416.	100.0	0.0	6.1	0.55	4.7
8. MASS AVE WB LT QUEUE	0.8	-13.0	0.8	-17.1	4.	180.	AG	364.	100.0	0.0	3.0	0.07	0.7
9. HARRISON AVE NB QUEU	-13.0	-1.5	-45.0	-1.5	32.	270.	AG	410.	100.0	0.0	3.0	0.62	5.3
10. HARISN AV SB LT QUEU	13.0	1.3	20.9	1.3	8.	90.	AG	410.	100.0	0.0	2.7	0.16	1.3
11. HARISN AV SB T/R QUE	13.0	4.0	35.9	3.4	23.	91.	AG	410.	100.0	0.0	2.7	0.46	3.8

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. RESTAURANT	-13.7	9.1	1.8
2. RESIDENCE	15.2	14.5	1.8
3. BUS STOP SHELTER	13.0	-23.6	1.8
4. #860 HARRISON AVE	-24.4	-15.2	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA

RUN: 2000 NO-BLD AM 8-HR #8 MASS AVE/HARISON

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	4.5	3.6	4.8	4.4
10.	5.2	3.3	4.1	4.7
20.	5.7	3.1	3.8	5.0
30.	5.9	3.0	3.7	5.0
40.	6.0	3.0	3.5	4.6
50.	5.9	3.0	3.4	4.4
60.	5.8	3.0	3.2	4.3
70.	5.6	3.0	3.3	4.2
80.	5.4	3.1	3.2	4.2
90.	5.2	3.2	3.2	4.3
100.	5.2	3.4	3.1	4.1
110.	4.7	3.6	3.0	3.9
120.	4.4	3.7	3.0	3.9
130.	4.3	3.8	3.1	3.8
140.	4.5	4.0	3.1	3.7
150.	4.7	4.1	3.1	3.7
160.	4.7	4.3	3.3	3.6
170.	4.6	4.6	3.6	3.6
180.	4.5	5.0	4.1	3.4
190.	4.1	5.0	4.5	3.2
200.	3.9	4.7	4.6	3.0
210.	3.9	4.4	4.8	3.0
220.	4.0	4.2	4.7	3.0
230.	4.0	4.1	4.8	3.0
240.	3.9	4.4	4.7	3.0
250.	3.9	4.7	4.7	3.0
260.	3.7	4.9	4.7	3.1
270.	3.4	5.1	4.8	3.2
280.	3.2	5.0	5.1	3.3
290.	3.1	4.9	5.1	3.3
300.	3.0	4.8	5.2	3.5
310.	3.0	4.7	5.1	3.6
320.	3.0	4.6	5.3	3.7
330.	3.1	4.3	5.2	3.7
340.	3.3	4.1	5.1	3.7
350.	3.7	3.9	5.2	3.9
360.	4.5	3.6	4.8	4.4
MAX	6.0	5.1	5.3	5.0
DEGR.	40	270	320	20

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 1-HOUR #9 MASS AVE/ALBANY
DATE: 04/25/91
TIME: 17:01:14

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. MASS AVE EAST FRE FL	-0.8	0.0	-0.8	-499.9	500.	180.	AG	2830.	24.8	0.0	28.1		
2. MASS AVE WEST FF	-1.5	0.0	-1.5	499.9	500.	360.	AG	2535.	24.8	0.0	24.3		
3. HARRISON AV NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1660.	24.8	0.0	20.5		
4. HARRISON AV SOUTH FF	0.0	-0.8	-499.9	-0.8	500.	270.	AG	1010.	24.8	0.0	19.7		
5. MASS AVE EB T/R QUEU	-7.6	9.1	-7.6	29.7	21.	360.	AG	733.	100.0	0.0	6.1	0.39	3.4
6. MASS AVE EB LT QUEUE	-3.0	9.1	-3.0	140.4	131.	360.	AG	807.	100.0	0.0	3.0	1.21	21.9
7. MASS AVE WB LT QUEUE	0.0	-13.0	0.0	-24.6	12.	180.	AG	807.	100.0	0.0	3.0	0.50	1.9
8. MASS AVE WB THR QUEU	4.6	-13.0	4.6	-50.0	37.	180.	AG	733.	100.0	0.0	6.1	0.64	6.2
9. MASS AVE WB RT QUEU	9.1	-13.0	9.1	-50.0	37.	180.	AG	367.	100.0	0.0	3.0	0.64	6.2
10. ALBANY ST. NB QUEU	-15.2	-4.6	-48.0	-4.6	33.	270.	AG	1239.	100.0	0.0	6.1	0.60	5.5
11. HARRISON AVE SB QUEU	14.5	0.0	33.9	0.0	19.	90.	AG	1239.	100.0	0.0	6.1	0.37	3.2

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. BOSTON EMS	-18.3	29.0	1.8
2. BOSTON CITY HOSP.	27.4	13.0	1.8
3. #784 MASS AVE.	13.7	-29.7	1.8
4. BUS STOP SHELTER	-13.7	-21.3	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 1-HOUR #9 MASS AVE/ALBANY

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrstions, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	7.2	6.0	9.6	10.2
10.	8.2	5.3	8.1	10.7
20.	8.4	5.1	7.2	9.8
30.	8.3	5.0	6.7	9.0
40.	8.0	5.0	6.4	8.9
50.	7.7	5.1	6.1	9.0
60.	7.7	5.1	6.0	9.7
70.	7.8	5.2	5.9	10.1
80.	8.3	5.7	5.8	10.3
90.	8.9	6.3	5.5	9.8
100.	9.6	6.7	5.2	9.3
110.	9.9	6.7	5.1	8.7
120.	10.3	6.6	5.1	8.5
130.	10.4	6.6	5.2	8.5
140.	10.1	6.8	5.2	8.3
150.	10.0	7.1	5.3	8.3
160.	9.8	7.7	5.7	8.4
170.	9.3	8.3	6.7	8.4
180.	8.4	9.4	8.2	7.9
190.	7.3	10.3	9.3	6.7
200.	6.7	10.6	9.7	5.8
210.	6.4	10.4	9.8	5.4
220.	6.1	10.0	9.8	5.3
230.	5.8	9.3	9.7	5.2
240.	5.7	8.8	9.4	5.2
250.	5.5	8.5	9.3	5.1
260.	5.5	8.8	9.5	5.2
270.	5.3	8.3	9.9	5.5
280.	5.1	7.8	10.6	6.0
290.	5.0	7.3	11.0	6.7
300.	5.0	7.2	11.4	7.2
310.	5.0	6.9	11.7	7.6
320.	5.0	7.0	11.4	7.6
330.	5.1	7.1	11.4	7.7
340.	5.2	7.1	11.3	7.8
350.	6.0	6.7	10.8	9.0
360.	7.2	6.0	9.6	10.2
MAX	10.4	10.6	11.7	10.7
DEGR.	130	200	310	10

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 8-HOUR #9 MASS AVE/ALBANY
DATE: 04/25/91
TIME: 17:09:12

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. MASS AVE EAST FRE FL	-0.8	0.0	-0.8	-499.9	500.	180.	AG	2406.	12.5	0.0	28.1		
2. MASS AVE WEST FF	-1.5	0.0	-1.5	499.9	500.	360.	AG	2155.	12.5	0.0	24.3		
3. HARRISON AV NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1411.	12.5	0.0	20.5		
4. HARRISON AV SOUTH FF	0.0	-0.8	-499.9	-0.8	500.	270.	AG	859.	12.5	0.0	19.7		
5. MASS AVE EB T/R QUEU	-7.6	9.1	-7.6	26.4	17.	360.	AG	467.	100.0	0.0	6.1	0.33	2.9
6. MASS AVE EB LT QUEUE	-3.0	9.1	-3.0	59.3	50.	360.	AG	514.	100.0	0.0	3.0	1.04	8.4
7. MASS AVE WB LT QUEUE	0.0	-13.0	0.0	-22.7	10.	180.	AG	514.	100.0	0.0	3.0	0.43	1.6
8. MASS AVE WB THR QUEU	4.6	-13.0	4.6	-43.1	30.	180.	AG	467.	100.0	0.0	6.1	0.54	5.0
9. MASS AVE WB RT QUEU	9.1	-13.0	9.1	-43.1	30.	180.	AG	234.	100.0	0.0	3.0	0.54	5.0
10. ALBANY ST. NB QUEU	-15.2	-4.6	-42.4	-4.6	27.	270.	AG	789.	100.0	0.0	6.1	0.51	4.5
11. HARRISON AVE SB QUEU	14.5	0.0	30.9	0.0	16.	90.	AG	789.	100.0	0.0	6.1	0.32	2.7

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. BOSTON EMS	-18.3	29.0	1.8
2. BOSTON CITY HOSP.	27.4	13.0	1.8
3. #784 MASS AVE.	13.7	-29.7	1.8
4. BUS STOP SHELTER	-13.7	-21.3	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 8-HOUR #9 MASS AVE/ALBANY

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	3.7	3.3	5.2	5.4
10.	4.1	3.1	4.5	5.4
20.	4.2	3.0	4.0	5.2
30.	4.3	3.0	3.8	4.8
40.	4.4	3.0	3.6	4.8
50.	4.4	3.0	3.5	4.9
60.	4.4	3.0	3.4	5.5
70.	4.2	3.1	3.4	5.5
80.	4.4	3.3	3.3	5.6
90.	4.8	3.6	3.2	5.4
100.	5.0	3.7	3.1	5.1
110.	5.4	3.7	3.0	4.9
120.	5.5	3.6	3.1	4.7
130.	5.6	3.6	3.1	4.5
140.	5.7	3.6	3.1	4.5
150.	5.6	3.8	3.1	4.3
160.	5.2	4.1	3.3	4.4
170.	5.2	4.6	3.7	4.4
180.	4.6	5.1	4.3	4.2
190.	4.1	5.8	4.7	3.7
200.	3.9	5.8	4.9	3.3
210.	3.7	5.8	5.3	3.2
220.	3.5	5.5	5.4	3.1
230.	3.4	5.3	5.4	3.1
240.	3.2	4.9	5.4	3.1
250.	3.2	4.8	5.3	3.0
260.	3.2	4.8	5.4	3.1
270.	3.1	4.6	5.6	3.2
280.	3.0	4.5	6.0	3.5
290.	3.0	4.1	6.2	3.7
300.	3.0	4.0	6.3	4.2
310.	3.0	4.0	6.5	4.4
320.	3.0	3.8	6.5	4.5
330.	3.0	3.8	6.2	4.4
340.	3.1	3.7	6.1	4.5
350.	3.3	3.5	5.6	4.9
360.	3.7	3.3	5.2	5.4
MAX	5.7	5.8	6.5	5.6
DEGR.	140	190	310	80

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 1-HR #9 MASS AVE/ALBANY
DATE: 04/25/91
TIME: 17:08:07

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. MASS AVE EAST FRE FL	-0.8	0.0	-0.8	-499.9	500.	180.	AG	2535.	24.8	0.0	28.1		
2. MASS AVE WEST FF	-1.5	0.0	-1.5	499.9	500.	360.	AG	2360.	24.8	0.0	24.3		
3. HARRISON AV NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1310.	24.8	0.0	20.5		
4. HARRISON AV SOUTH FF	0.0	-0.8	-499.9	-0.8	500.	270.	AG	995.	24.8	0.0	19.7		
5. MASS AVE EB T/R QUEU	-7.6	9.1	-7.6	29.1	20.	360.	AG	717.	100.0	0.0	6.1	0.38	3.3
6. MASS AVE EB LT QUEUE	-3.0	9.1	-3.0	125.1	116.	360.	AG	823.	100.0	0.0	3.0	1.25	19.3
7. MASS AVE WB LT QUEUE	0.0	-13.0	0.0	-25.9	13.	180.	AG	823.	100.0	0.0	3.0	0.68	2.2
8. MASS AVE WB THR QUEU	4.6	-13.0	4.6	-48.8	36.	180.	AG	717.	100.0	0.0	6.1	0.63	6.0
9. MASS AVE WB RT QUEU	9.1	-13.0	9.1	-31.8	19.	180.	AG	359.	100.0	0.0	3.0	0.36	3.1
10. ALBANY ST. NB QUEU	-15.2	-4.6	-46.4	-4.6	31.	270.	AG	1222.	100.0	0.0	6.1	0.57	5.2
11. HARRISON AVE SB QUEU	14.5	0.0	32.0	0.0	18.	90.	AG	1222.	100.0	0.0	6.1	0.33	2.9

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. BOSTON EMS	-18.3	29.0	1.8
2. BOSTON CITY HOSP.	27.4	13.0	1.8
3. #784 MASS AVE.	13.7	-29.7	1.8
4. BUS STOP SHELTER	-13.7	-21.3	1.8

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrstions, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	7.0	5.9	9.2	10.0
10.	8.0	5.3	7.8	10.4
20.	8.3	5.1	6.9	9.4
30.	8.1	5.0	6.4	8.7
40.	7.9	5.0	6.1	8.6
50.	7.6	5.0	6.0	8.7
60.	7.6	5.1	5.7	9.2
70.	7.7	5.2	5.8	9.5
80.	8.0	5.5	5.6	9.8
90.	8.6	6.1	5.4	9.6
100.	9.2	6.4	5.1	8.9
110.	9.6	6.3	5.1	8.4
120.	10.0	6.2	5.1	8.1
130.	10.0	6.1	5.2	8.1
140.	9.9	6.3	5.2	7.9
150.	9.7	6.6	5.3	7.8
160.	9.4	7.0	5.5	8.0
170.	9.0	7.7	6.3	8.0
180.	8.2	8.8	7.5	7.6
190.	7.2	9.8	8.2	6.5
200.	6.6	10.2	8.4	5.7
210.	6.3	10.0	8.5	5.4
220.	6.1	9.6	8.6	5.2
230.	5.8	9.0	8.6	5.2
240.	5.6	8.6	8.6	5.2
250.	5.5	8.3	8.6	5.1
260.	5.5	8.5	9.1	5.2
270.	5.3	8.2	9.7	5.5
280.	5.1	7.6	10.4	6.0
290.	5.0	7.3	10.8	6.6
300.	5.0	7.0	11.3	7.1
310.	5.0	6.9	11.4	7.5
320.	5.0	6.9	11.2	7.6
330.	5.1	7.0	10.9	7.6
340.	5.2	6.9	10.8	7.8
350.	5.9	6.6	10.5	8.7
360.	7.0	5.9	9.2	10.0
MAX	10.0	10.2	11.4	10.4
DEGR.	120	200	310	10

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 8-HR #9 MASS AVE/ALBANY
DATE: 04/25/91
TIME: 17:12:55

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. MASS AVE EAST FRE FL	-0.8	0.0	-0.8	-499.9	500.	180.	AG	2155.	12.5	0.0	28.1		
2. MASS AVE WEST FF	-1.5	0.0	-1.5	499.9	500.	360.	AG	2066.	12.5	0.0	24.3		
3. HARRISON AV NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1114.	12.5	0.0	20.5		
4. HARRISON AV SOUTH FF	0.0	-0.8	-499.9	-0.8	500.	270.	AG	846.	12.5	0.0	19.7		
5. MASS AVE EB T/R QUEU	-7.6	9.1	-7.6	26.4	17.	360.	AG	467.	100.0	0.0	6.1	0.33	2.9
6. MASS AVE EB LT QUEUE	-3.0	9.1	-3.0	28.5	19.	360.	AG	514.	100.0	0.0	3.0	0.78	3.2
7. MASS AVE WB LT QUEUE	0.0	-13.0	0.0	-22.7	10.	180.	AG	514.	100.0	0.0	3.0	0.43	1.6
8. MASS AVE WB THR QUEU	4.6	-13.0	4.6	-43.1	30.	180.	AG	467.	100.0	0.0	6.1	0.54	5.0
9. MASS AVE WB RT QUEU	9.1	-13.0	9.1	-29.3	16.	180.	AG	234.	100.0	0.0	3.0	0.31	2.7
10. ALBANY ST. NB QUEU	-15.2	-4.6	-41.7	-4.6	26.	270.	AG	789.	100.0	0.0	6.1	0.50	4.4
11. HARRISON AVE SB QUEU	14.5	0.0	29.6	0.0	15.	90.	AG	789.	100.0	0.0	6.1	0.29	2.5

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. BOSTON EMS	-18.3	29.0	1.8
2. BOSTON CITY HOSP.	27.4	13.0	1.8
3. #784 MASS AVE.	13.7	-29.7	1.8
4. BUS STOP SHELTER	-13.7	-21.3	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 8-HR #9 MASS AVE/ALBANY

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrstions, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	3.7	3.3	5.0	5.2
10.	3.9	3.1	4.3	5.2
20.	3.9	3.0	3.9	4.9
30.	3.8	3.0	3.7	4.6
40.	3.7	3.0	3.5	4.7
50.	3.7	3.0	3.5	4.7
60.	3.6	3.0	3.3	5.3
70.	3.7	3.1	3.3	5.4
80.	4.0	3.2	3.3	5.5
90.	4.3	3.5	3.2	5.1
100.	4.8	3.6	3.1	5.0
110.	5.2	3.6	3.0	4.7
120.	5.5	3.5	3.0	4.5
130.	5.5	3.4	3.1	4.3
140.	5.5	3.5	3.1	4.3
150.	5.6	3.6	3.1	4.2
160.	5.1	3.8	3.2	4.2
170.	5.0	4.2	3.5	4.3
180.	4.6	4.9	4.0	4.1
190.	4.1	5.5	4.3	3.7
200.	3.9	5.6	4.4	3.3
210.	3.7	5.6	4.6	3.2
220.	3.5	5.4	4.7	3.1
230.	3.3	5.1	4.7	3.1
240.	3.2	4.8	4.7	3.1
250.	3.2	4.7	4.8	3.0
260.	3.2	4.7	4.8	3.1
270.	3.1	4.5	5.1	3.2
280.	3.0	4.3	5.7	3.5
290.	3.0	3.9	5.9	3.7
300.	3.0	3.8	6.2	4.1
310.	3.0	3.7	6.4	4.3
320.	3.0	3.5	6.3	4.5
330.	3.0	3.5	6.0	4.4
340.	3.1	3.6	5.9	4.5
350.	3.3	3.5	5.5	4.8
360.	3.7	3.3	5.0	5.2
MAX	5.6	5.6	6.4	5.5
DEGR.	150	200	310	80

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD PM 1-HR #10 MASS AVE/MEL CASS
DATE: 04/25/91
TIME: 21:13:10

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. S. HAMPTON EAST FF	0.0	-3.0	499.9	-3.0	500.	90.	AG	2085.	24.8	0.0	30.4		
2. MASS AVE WEST FRE FL	0.0	-3.0	-499.9	-3.0	500.	270.	AG	2570.	24.8	0.0	30.4		
3. MASS AVE CONNECTR FF	-3.8	0.0	-3.8	499.9	500.	360.	AG	3290.	20.7	0.0	36.6		
4. MELNEA CASS BLVD FF	-3.8	0.0	-3.8	-499.9	500.	180.	AG	2445.	20.7	0.0	28.9		
5. MASS AVE EB LT QUEUE	-16.8	-6.1	-51.0	-6.1	34.	270.	AG	1304.	100.0	0.0	6.1	0.66	5.7
6. MASS AVE EB T/R QUEU	-16.8	-12.2	-83.8	-12.2	67.	270.	AG	1304.	100.0	0.0	6.1	0.96	11.2
7. SOUTHHAMPTON WB QUEU	10.7	3.0	30.3	3.0	20.	90.	AG	2673.	100.0	0.0	12.2	0.42	3.3
8. MELNEA CAS NB LT QUE	-4.6	-21.3	-4.6	-24.2	3.	180.	AG	815.	100.0	0.0	3.0	0.13	0.5
9. MELNA CAS NB T/R QUE	2.3	-21.3	2.3	-66.5	45.	180.	AG	1760.	100.0	0.0	9.1	0.74	7.5
10. MASS AVE CON SB LT Q	-5.0	13.0	-5.0	49.3	36.	360.	AG	774.	100.0	0.0	3.8	0.93	6.1
11. MASS AVE CON T/R QUE	-11.1	13.0	-11.1	49.9	37.	360.	AG	1092.	100.0	0.0	7.6	0.62	6.2
12. SOUTHAMPTON YIELD FF	26.7	9.9	9.9	31.2	27.	322.	AG	15.	24.8	0.0	9.7		
13. MASS AVE CON YIEL FF	-26.7	20.6	-29.0	9.1	12.	191.	AG	760.	20.7	0.0	9.7		

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. PARKING AREA	-26.7	20.6	1.8
2. PET FOOD STORE	30.5	15.2	1.8
3. GAS PUMP	30.5	-22.9	1.8
4. GAS PUMP	21.3	-30.5	1.8
5. OPEN FIELD	-18.3	-18.3	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD PM 1-HR #10 MASS AVE/MEL CASS

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5
0.	6.7	5.8	9.0	9.7	14.9
10.	7.6	5.3	7.5	8.4	14.3
20.	8.1	5.1	6.7	7.4	12.6
30.	8.5	5.0	6.3	6.6	11.4
40.	9.0	5.1	6.3	6.2	10.6
50.	9.3	5.1	6.4	6.1	10.3
60.	9.3	5.1	6.5	6.2	10.3
70.	9.3	5.2	6.7	6.3	10.2
80.	9.8	5.7	6.7	6.2	10.1
90.	10.8	6.4	6.3	5.8	10.0
100.	11.4	6.9	5.6	5.3	9.3
110.	11.1	6.8	5.2	5.1	9.1
120.	10.3	6.6	5.1	5.0	9.2
130.	9.8	6.5	5.0	5.0	9.4
140.	9.7	6.4	5.0	5.0	9.6
150.	10.2	6.6	5.0	5.0	9.2
160.	11.0	7.1	5.0	5.1	8.6
170.	11.1	8.4	5.2	5.3	8.0
180.	10.7	10.3	5.6	5.9	7.2
190.	10.1	12.2	6.1	6.7	6.1
200.	9.7	13.6	6.6	7.6	5.5
210.	9.4	14.5	7.2	8.2	5.3
220.	9.1	14.6	7.7	8.7	5.4
230.	8.6	14.2	8.0	9.0	5.3
240.	8.0	13.4	8.0	8.9	5.5
250.	7.6	12.6	8.2	9.0	6.1
260.	7.0	11.4	9.1	9.5	7.9
270.	6.4	9.9	10.0	10.7	10.6
280.	5.7	8.6	10.6	11.5	12.8
290.	5.2	7.9	9.8	11.4	14.0
300.	5.1	7.6	9.3	10.5	14.2
310.	5.2	7.3	9.5	9.5	14.0
320.	5.2	6.9	10.3	9.1	13.5
330.	5.2	6.6	11.1	9.5	13.2
340.	5.2	6.5	11.0	10.1	13.4
350.	5.7	6.3	10.3	10.3	14.0
360.	6.7	5.8	9.0	9.7	14.9
MAX	11.4	14.6	11.1	11.5	14.9
DEGR.	100	220	330	280	0

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD PM 8-HR #10 MASS AVE/MEL CASS
DATE: 04/25/91
TIME: 21:12:26

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. S. HAMPTON EAST FF	0.0	-3.0	499.9	-3.0	500.	90.	AG	1772.	12.5	0.0	30.4		
2. MASS AVE WEST FRE FL	0.0	-3.0	-499.9	-3.0	500.	270.	AG	2185.	12.5	0.0	30.4		
3. MASS AVE CONNECTR FF	-3.8	0.0	-3.8	499.9	500.	360.	AG	2797.	10.7	0.0	36.6		
4. MELNEA CASS BLVD FF	-3.8	0.0	-3.8	-499.9	500.	180.	AG	2078.	10.7	0.0	28.9		
5. MASS AVE EB LT QUEUE	-16.8	-6.1	-45.0	-6.1	28.	270.	AG	831.	100.0	0.0	6.1	0.57	4.7
6. MASS AVE EB T/R QUEU	-16.8	-12.2	-62.9	-12.2	46.	270.	AG	831.	100.0	0.0	6.1	0.82	7.7
7. SOUTHHAMPTON WB QUEU	10.7	3.0	27.1	3.0	16.	90.	AG	1704.	100.0	0.0	12.2	0.35	2.7
8. MELNEA CAS NB LT QUE	-4.6	-21.3	-4.6	-23.7	2.	180.	AG	519.	100.0	0.0	3.0	0.11	0.4
9. MELNA CAS NB T/R QUE	2.3	-21.3	2.3	-57.7	36.	180.	AG	1122.	100.0	0.0	9.1	0.63	6.1
10. MASS AVE CON SB LT Q	-5.0	13.0	-5.0	38.7	26.	360.	AG	493.	100.0	0.0	3.8	0.79	4.3
11. MASS AVE CON T/R QUE	-11.1	13.0	-11.1	43.5	31.	360.	AG	696.	100.0	0.0	7.6	0.52	5.1
12. SOUTHAMPTON YIELD FF	26.7	9.9	9.9	31.2	27.	322.	AG	13.	12.5	0.0	9.7		
13. MASS AVE CTR YIEL FF	-26.7	20.6	-29.0	9.1	12.	191.	AG	646.	10.7	0.0	9.7		

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. PARKING AREA	-26.7	20.6	1.8
2. PET FOOD STORE	30.5	15.2	1.8
3. GAS PUMP	30.5	-22.9	1.8
4. GAS PUMP	21.3	-30.5	1.8
5. OPEN FIELD	-18.3	-18.3	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD PM 8-HR #10 MASS AVE/MEL CASS

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5
0.	3.7	3.4	4.7	5.2	8.2
10.	4.1	3.1	4.0	4.6	7.9
20.	4.2	3.0	3.6	4.1	6.9
30.	4.5	3.0	3.5	3.6	6.1
40.	4.8	3.0	3.5	3.5	5.7
50.	5.1	3.0	3.6	3.5	5.6
60.	5.2	3.0	3.7	3.5	5.6
70.	5.3	3.1	3.7	3.5	5.6
80.	5.6	3.3	3.7	3.5	5.4
90.	6.1	3.6	3.5	3.3	5.4
100.	6.3	3.8	3.2	3.1	5.2
110.	6.4	3.8	3.1	3.0	5.2
120.	5.8	3.7	3.0	3.0	5.4
130.	5.3	3.6	3.0	3.0	5.4
140.	5.2	3.6	3.0	3.0	5.3
150.	5.5	3.5	3.0	3.0	5.0
160.	5.9	3.6	3.0	3.0	4.7
170.	6.1	3.9	3.1	3.1	4.3
180.	6.1	4.8	3.2	3.4	3.9
190.	5.7	5.9	3.4	3.7	3.5
200.	5.4	7.0	3.6	4.0	3.2
210.	5.3	7.6	3.9	4.4	3.2
220.	4.8	8.0	4.3	4.9	3.2
230.	4.5	7.8	4.6	5.2	3.2
240.	4.1	7.5	4.8	5.2	3.2
250.	4.0	7.0	4.9	5.2	3.5
260.	3.8	6.3	5.1	5.6	4.2
270.	3.6	5.6	5.4	5.9	5.7
280.	3.3	4.8	5.7	6.5	6.9
290.	3.2	4.4	5.5	6.3	7.8
300.	3.0	4.1	5.3	5.8	8.0
310.	3.0	3.9	5.4	5.3	8.1
320.	3.0	3.8	5.8	5.1	8.0
330.	3.0	3.6	6.1	5.1	7.8
340.	3.1	3.6	6.0	5.6	7.8
350.	3.3	3.6	5.4	5.6	8.0
360.	3.7	3.4	4.7	5.2	8.2
MAX	6.4	8.0	6.1	6.5	8.2
DEGR.	110	220	330	280	0

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD PM 1-HR #10 MASS AV/MEL CAS
DATE: 04/25/91
TIME: 21:15:25

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. S. HAMPTON EAST FF	0.0	-3.0	499.9	-3.0	500.	90.	AG	2025.	24.8	0.0	30.4		
2. MASS AVE WEST FRE FL	0.0	-3.0	-499.9	-3.0	500.	270.	AG	2360.	24.8	0.0	30.4		
3. MASS AVE CONNECTR FF	-3.8	0.0	-3.8	499.9	500.	360.	AG	3140.	20.7	0.0	36.6		
4. MELNEA CASS BLVD FF	-3.8	0.0	-3.8	-499.9	500.	180.	AG	2445.	20.7	0.0	28.9		
5. MASS AVE EB LT QUEUE	-16.8	-6.1	-44.4	-6.1	28.	270.	AG	1304.	100.0	0.0	6.1	0.56	4.6
6. MASS AVE EB T/R QUEU	-16.8	-12.2	-72.9	-12.2	56.	270.	AG	1304.	100.0	0.0	6.1	0.90	9.4
7. SOUTHHAMPTON WB QUEU	10.7	3.0	30.1	3.0	19.	90.	AG	2673.	100.0	0.0	12.2	0.41	3.2
8. MELNEA CAS NB LT QUE	-4.6	-21.3	-4.6	-24.2	3.	180.	AG	815.	100.0	0.0	3.0	0.13	0.5
9. MELNA CAS NB T/R QUE	2.3	-21.3	2.3	-66.5	45.	180.	AG	1760.	100.0	0.0	9.1	0.74	7.5
10. MASS AVE CON SB LT Q	-5.0	13.0	-5.0	49.3	36.	360.	AG	774.	100.0	0.0	3.8	0.93	6.1
11. MASS AVE CON T/R QUE	-11.1	13.0	-11.1	49.9	37.	360.	AG	1092.	100.0	0.0	7.6	0.62	6.2
12. SOUTHAMPTON YIELD FF	26.7	9.9	9.9	31.2	27.	322.	AG	15.	24.8	0.0	9.7		
13. MASS AVE CON YIEL FF	-26.7	20.6	-29.0	9.1	12.	191.	AG	705.	20.7	0.0	9.7		

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. PARKING AREA	-26.7	20.6	1.8
2. PET FOOD STORE	30.5	15.2	1.8
3. GAS PUMP	30.5	-22.9	1.8
4. GAS PUMP	21.3	-30.5	1.8
5. OPEN FIELD	-18.3	-18.3	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD PM 1-HR #10 MASS AV/MEL CAS

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5
0.	6.6	5.8	8.9	9.5	14.7
10.	7.5	5.3	7.5	8.4	14.1
20.	8.0	5.1	6.6	7.3	12.3
30.	8.4	5.0	6.2	6.6	11.0
40.	8.9	5.1	6.2	6.2	10.4
50.	9.2	5.1	6.3	6.1	10.2
60.	9.2	5.1	6.5	6.2	10.3
70.	9.2	5.2	6.7	6.2	10.1
80.	9.8	5.7	6.7	6.1	10.0
90.	10.6	6.4	6.2	5.7	9.8
100.	11.3	6.8	5.6	5.3	9.1
110.	11.1	6.8	5.2	5.1	9.0
120.	10.3	6.6	5.1	5.0	9.2
130.	9.6	6.4	5.0	5.0	9.4
140.	9.5	6.4	5.0	5.0	9.6
150.	10.1	6.5	5.0	5.0	9.2
160.	10.9	6.9	5.0	5.1	8.6
170.	11.0	8.3	5.2	5.3	8.0
180.	10.5	10.1	5.6	5.9	7.2
190.	10.0	12.0	6.1	6.7	6.1
200.	9.4	13.5	6.6	7.6	5.5
210.	8.9	14.4	7.2	8.2	5.3
220.	8.5	14.5	7.7	8.7	5.4
230.	7.9	14.0	8.0	9.0	5.3
240.	7.5	13.2	8.0	8.9	5.4
250.	7.2	12.3	8.2	9.0	6.1
260.	6.9	11.1	8.9	9.5	7.5
270.	6.3	9.5	9.8	10.5	9.9
280.	5.6	8.4	10.3	11.2	12.1
290.	5.2	7.9	9.6	11.1	13.2
300.	5.1	7.5	9.2	10.3	13.7
310.	5.2	7.3	9.5	9.4	13.6
320.	5.2	6.8	10.1	9.0	13.2
330.	5.2	6.5	11.0	9.5	13.0
340.	5.2	6.4	10.9	10.0	13.3
350.	5.7	6.2	10.3	10.2	13.8
360.	6.6	5.8	8.9	9.5	14.7
MAX	11.3	14.5	11.0	11.2	14.7
DEGR.	100	220	330	280	0

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD PM 8-HR #10 MAS AV/MEL CASS
DATE: 04/25/91
TIME: 21:16:20

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. S. HAMPTON EAST FF	0.0	-3.0	499.9	-3.0	500.	90.	AG	1721.	12.5	0.0	30.4		
2. MASS AVE WEST FRE FL	0.0	-3.0	-499.9	-3.0	500.	270.	AG	2006.	12.5	0.0	30.4		
3. MASS AVE CONNECTR FF	-3.8	0.0	-3.8	499.9	500.	360.	AG	2669.	10.7	0.0	36.6		
4. MELNEA CASS BLVD FF	-3.8	0.0	-3.8	-499.9	500.	180.	AG	2078.	10.7	0.0	28.9		
5. MASS AVE EB LT QUEUE	-16.8	-6.1	-39.8	-6.1	23.	270.	AG	831.	100.0	0.0	6.1	0.46	3.8
6. MASS AVE EB T/R QUEU	-16.8	-12.2	-58.3	-12.2	42.	270.	AG	831.	100.0	0.0	6.1	0.77	6.9
7. SOUTHHAMPTON WB QUEU	10.7	3.0	27.0	3.0	16.	90.	AG	1704.	100.0	0.0	12.2	0.35	2.7
8. MELNEA CAS NB LT QUE	-4.6	-21.3	-4.6	-23.7	2.	180.	AG	519.	100.0	0.0	3.0	0.11	0.4
9. MELNA CAS NB T/R QUE	2.3	-21.3	2.3	-57.7	36.	180.	AG	1122.	100.0	0.0	9.1	0.63	6.1
10. MASS AVE CON SB LT Q	-5.0	13.0	-5.0	38.7	26.	360.	AG	493.	100.0	0.0	3.8	0.79	4.3
11. MASS AVE CON T/R QUE	-11.1	13.0	-11.1	43.5	31.	360.	AG	696.	100.0	0.0	7.6	0.52	5.1
12. SOUTHAMPTON YIELD FF	26.7	9.9	9.9	31.2	27.	322.	AG	13.	12.5	0.0	9.7		
13. MASS AVE CTR YIEL FF	-26.7	20.6	-29.0	9.1	12.	191.	AG	600.	10.7	0.0	9.7		

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. PARKING AREA	-26.7	20.6	1.8
2. PET FOOD STORE	30.5	15.2	1.8
3. GAS PUMP	30.5	-22.9	1.8
4. GAS PUMP	21.3	-30.5	1.8
5. OPEN FIELD	-18.3	-18.3	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD PM 8-HR #10 MAS AV/MEL CASS

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4	REC5
0.	3.7	3.3	4.7	5.2	8.1
10.	4.0	3.1	4.0	4.6	7.8
20.	4.2	3.0	3.6	4.1	6.7
30.	4.5	3.0	3.5	3.6	6.0
40.	4.8	3.0	3.5	3.5	5.6
50.	5.1	3.0	3.6	3.5	5.6
60.	5.2	3.0	3.6	3.5	5.5
70.	5.3	3.1	3.7	3.5	5.6
80.	5.6	3.3	3.7	3.5	5.4
90.	6.0	3.6	3.5	3.3	5.4
100.	6.3	3.8	3.2	3.1	5.1
110.	6.3	3.8	3.1	3.0	5.2
120.	5.6	3.7	3.0	3.0	5.3
130.	5.2	3.6	3.0	3.0	5.4
140.	5.2	3.6	3.0	3.0	5.3
150.	5.5	3.5	3.0	3.0	5.0
160.	5.9	3.6	3.0	3.0	4.7
170.	6.1	3.9	3.1	3.1	4.3
180.	5.8	4.7	3.2	3.4	3.9
190.	5.6	5.9	3.4	3.7	3.5
200.	5.2	7.0	3.6	4.0	3.2
210.	4.8	7.6	3.9	4.4	3.1
220.	4.6	7.9	4.3	4.9	3.2
230.	4.1	7.7	4.6	5.2	3.2
240.	3.9	7.4	4.8	5.2	3.1
250.	3.8	6.8	4.9	5.2	3.4
260.	3.8	6.2	5.0	5.5	4.2
270.	3.6	5.2	5.3	5.9	5.4
280.	3.3	4.8	5.4	6.3	6.6
290.	3.1	4.4	5.3	6.2	7.3
300.	3.0	4.1	5.1	5.8	7.8
310.	3.0	3.9	5.4	5.2	7.9
320.	3.0	3.7	5.7	5.0	7.7
330.	3.0	3.6	6.0	5.1	7.6
340.	3.1	3.6	6.0	5.5	7.7
350.	3.3	3.5	5.4	5.6	7.9
360.	3.7	3.3	4.7	5.2	8.1
MAX	6.3	7.9	6.0	6.3	8.1
DEGR.	100	220	330	280	0

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 1-HOUR #12 SOUTHAMPTON/I-93
DATE: 04/25/91
TIME: 21:58:12

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. SOUTHAMPTON ST. E FF*	0.0	0.0	499.9	0.0	500.	90.	AG	1195.	24.8	0.0	21.2		
2. SOUTHAMPTON ST. W FF*	0.0	0.0	-499.9	0.0	500.	270.	AG	1355.	24.8	0.0	21.2		
3. I-93 OFF-RAMP FR FLO*	27.4	0.0	27.4	-499.9	500.	180.	AG	355.	24.8	0.0	12.1		
4. FRONTAGE RD FRE FLOW*	0.0	0.0	0.0	30.5	30.	360.	AG	400.	24.8	0.0	12.1		
5. FRONTAGE RD FRE FLOW*	30.5	0.0	-676.4	706.9	1000.	315.	AG	705.	24.8	0.0	10.6		
6. OFF-RAMP LEFT QUEUE*	26.7	-9.1	26.7	-697.0	688.	180.	AG	896.	100.0	0.0	3.0	7.24	114.6
7. OFF-RAMP RIGHT QUEUE*	33.5	-7.6	31.6	-10.1	3.	217.	AG	150.	100.0	0.0	3.0	0.08	0.5
8. OFF-RAMP THRU QUEUE*	23.6	-9.1	23.6	-205.1	196.	180.	AG	896.	100.0	0.0	3.0	1.71	32.7

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NORTHWEST CORNER	-18.3	10.7	1.8
2. RAILROAD YARD	27.4	10.7	1.8
3. OPEN FIELD	35.8	-11.4	1.8
4. W CORNER NEAR RAMP	19.1	-18.3	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 1-HOUR #12 SOUTHAMPTON/I-93

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	5.3	5.1	6.0	6.4
10.	5.3	5.0	5.8	6.8
20.	5.2	5.0	5.8	7.6
30.	5.4	5.1	5.8	8.4
40.	5.4	5.1	5.9	9.1
50.	5.4	5.1	6.0	9.6
60.	5.5	5.2	6.1	9.8
70.	5.8	5.3	6.3	10.0
80.	6.2	5.7	6.4	10.1
90.	6.8	6.4	6.2	9.8
100.	7.2	6.6	5.7	9.6
110.	7.2	6.5	5.3	9.4
120.	7.3	6.3	5.1	9.4
130.	7.6	6.3	5.1	9.7
140.	7.6	6.2	5.1	10.0
150.	7.6	6.7	5.0	10.6
160.	7.5	7.7	5.5	11.1
170.	7.4	9.5	6.7	11.2
180.	6.8	10.7	8.3	10.1
190.	6.2	10.2	9.3	7.8
200.	5.9	8.6	9.5	5.9
210.	6.0	7.3	9.1	5.2
220.	6.1	6.9	8.7	5.0
230.	6.2	6.7	8.5	5.0
240.	6.3	6.9	8.3	5.0
250.	6.5	7.2	8.3	5.1
260.	6.7	7.3	8.6	5.3
270.	6.5	7.2	8.8	5.7
280.	5.8	6.7	8.6	6.0
290.	5.4	6.4	8.0	6.0
300.	5.2	6.3	7.5	6.0
310.	5.3	6.3	7.4	6.1
320.	5.4	5.9	7.2	6.3
330.	5.4	5.5	6.8	6.2
340.	5.3	5.2	6.4	6.2
350.	5.3	5.1	6.2	6.1
360.	5.3	5.1	6.0	6.4
MAX	7.6	10.7	9.5	11.2
DEGR.	130	180	200	170

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 8-HOUR #12 SOUTHAMPTON/I-93
DATE: 04/25/91
TIME: 22:22:22

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. SOUTHAMPTON ST. E FF	0.0	0.0	499.9	0.0	500.	90.	AG	1016.	12.5	0.0	21.2		
2. SOUTHAMPTON ST. W FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1152.	12.5	0.0	21.2		
3. I-93 OFF-RAMP FR FLO	27.4	0.0	27.4	-499.9	500.	180.	AG	302.	15.0	0.0	12.1		
4. FRONTAGE RD FRE FLOW	0.0	0.0	0.0	30.5	30.	360.	AG	340.	15.0	0.0	12.1		
5. FRONTAGE RD FRE FLOW	30.5	0.0	-676.4	706.9	1000.	315.	AG	600.	15.0	0.0	10.6		
6. OFF-RAMP LEFT QUEUE	26.7	-9.1	26.7	-450.1	441.	180.	AG	571.	100.0	0.0	3.0	2.36	73.5
7. OFF-RAMP RIGHT QUEUE	33.5	-7.6	31.6	-10.1	3.	217.	AG	76.	100.0	0.0	3.0	0.07	0.5
8. OFF-RAMP THRU QUEUE	23.6	-9.1	23.6	-16.8	8.	180.	AG	571.	100.0	0.0	3.0	0.56	1.3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NORTHWEST CORNER	-18.3	10.7	1.8
2. RAILROAD YARD	27.4	10.7	1.8
3. OPEN FIELD	35.8	-11.4	1.8
4. W CORNER NEAR RAMP	19.1	-18.3	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BLD AM 8-HOUR #12 SOUTHAMPTON/I-93

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	3.1	3.0	3.5	3.7
10.	3.1	3.0	3.4	4.0
20.	3.1	3.0	3.3	4.4
30.	3.1	3.0	3.4	4.9
40.	3.2	3.0	3.4	5.1
50.	3.2	3.0	3.4	5.3
60.	3.2	3.1	3.5	5.5
70.	3.4	3.1	3.6	5.3
80.	3.5	3.3	3.6	5.1
90.	3.8	3.6	3.5	4.8
100.	4.0	3.6	3.3	4.4
110.	4.0	3.6	3.1	4.2
120.	4.0	3.6	3.1	4.2
130.	4.0	3.6	3.0	4.3
140.	4.0	3.6	3.0	4.5
150.	4.0	3.8	3.0	4.6
160.	4.0	4.2	3.2	4.8
170.	3.9	5.0	3.7	4.8
180.	3.6	5.4	4.3	4.5
190.	3.5	5.2	4.6	3.8
200.	3.4	4.5	4.6	3.2
210.	3.4	4.1	4.5	3.0
220.	3.5	3.7	4.5	3.0
230.	3.5	3.8	4.4	3.0
240.	3.6	3.9	4.4	3.0
250.	3.7	3.9	4.7	3.0
260.	3.7	4.1	4.8	3.1
270.	3.6	4.1	4.8	3.3
280.	3.4	3.8	4.8	3.4
290.	3.2	3.8	4.6	3.5
300.	3.1	3.6	4.2	3.4
310.	3.2	3.6	4.0	3.5
320.	3.2	3.4	4.0	3.6
330.	3.2	3.2	3.9	3.6
340.	3.2	3.1	3.7	3.6
350.	3.1	3.0	3.4	3.6
360.	3.1	3.0	3.5	3.7
MAX	4.0	5.4	4.8	5.5
DEGR.	100	180	260	60

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 1-HR #12 SOUTHAMPTON/I-93
DATE: 04/25/91
TIME: 22:00:33

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	ERG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. SOUTHAMPTON ST. E FF	0.0	0.0	499.9	0.0	500.	90.	AG	1190.	24.8	0.0	21.2		
2. SOUTHAMPTON ST. W FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1330.	24.8	0.0	21.2		
3. I-93 OFF-RAMP FR FLO	27.4	0.0	27.4	-499.9	500.	180.	AG	335.	24.8	0.0	12.1		
4. FRONTAGE RD FRE FLOW	0.0	0.0	0.0	30.5	30.	360.	AG	400.	24.8	0.0	12.1		
5. FRONTAGE RD FRE FLOW	30.5	0.0	-676.4	706.9	1000.	315.	AG	645.	24.8	0.0	10.6		
6. OFF-RAMP LEFT QUEUE	26.7	-9.1	26.7	-625.8	617.	180.	AG	896.	100.0	0.0	3.0	6.13	102.8
7. OFF-RAMP RIGHT QUEUE	33.5	-7.6	31.6	-10.1	3.	217.	AG	150.	100.0	0.0	3.0	0.08	0.5
8. OFF-RAMP THRU QUEUE	23.6	-9.1	23.6	-196.0	187.	180.	AG	896.	100.0	0.0	3.0	1.58	31.1

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NORTHWEST CORNER	-18.3	10.7	1.8
2. RAILROAD YARD	27.4	10.7	1.8
3. OPEN FIELD	35.8	-11.4	1.8
4. W CORNER NEAR RAMP	19.1	-18.3	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 1-HR #12 SOUTHAMPTON/I-93

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentrstion, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	5.2	5.1	6.0	6.4
10.	5.2	5.0	5.8	6.7
20.	5.2	5.0	5.8	7.6
30.	5.4	5.1	5.8	8.3
40.	5.4	5.1	5.9	9.0
50.	5.4	5.1	6.0	9.6
60.	5.5	5.2	6.1	9.7
70.	5.8	5.3	6.3	10.0
80.	6.2	5.7	6.4	10.0
90.	6.8	6.3	6.2	9.7
100.	7.1	6.6	5.7	9.5
110.	7.2	6.4	5.3	9.3
120.	7.3	6.3	5.1	9.4
130.	7.6	6.2	5.1	9.7
140.	7.6	6.2	5.1	10.0
150.	7.6	6.6	5.0	10.5
160.	7.5	7.7	5.5	11.1
170.	7.3	9.5	6.7	11.2
180.	6.8	10.7	8.3	10.0
190.	6.0	10.1	9.3	7.8
200.	5.9	8.5	9.5	5.9
210.	6.0	7.2	9.0	5.2
220.	6.1	6.8	8.7	5.0
230.	6.2	6.6	8.5	5.0
240.	6.3	6.8	8.3	5.0
250.	6.5	7.1	8.2	5.1
260.	6.7	7.3	8.5	5.3
270.	6.4	7.1	8.7	5.7
280.	5.8	6.6	8.5	6.0
290.	5.4	6.3	7.9	6.0
300.	5.2	6.2	7.5	6.0
310.	5.2	6.2	7.4	6.1
320.	5.4	5.9	7.1	6.2
330.	5.4	5.5	6.8	6.2
340.	5.3	5.2	6.3	6.1
350.	5.3	5.1	6.2	6.1
360.	5.2	5.1	6.0	6.4
MAX	7.6	10.7	9.5	11.2
DEGR.	130	180	200	170

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 8-HR #12 SOUTHAMPTON/I-93
DATE: 04/25/91
TIME: 22:23:13

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. SOUTHAMPTON ST. E FF	0.0	0.0	499.9	0.0	500.	90.	AG	1012.	12.5	0.0	21.2		
2. SOUTHAMPTON ST. W FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1131.	12.5	0.0	21.2		
3. I-93 OFF-RAMP FR FLO	27.4	0.0	27.4	-499.9	500.	180.	AG	285.	15.0	0.0	12.1		
4. FRONTAGE RD FRE FLOW	0.0	0.0	0.0	30.5	30.	360.	AG	340.	15.0	0.0	12.1		
5. FRONTAGE RD FRE FLOW	30.5	0.0	-676.4	706.9	1000.	315.	AG	548.	15.0	0.0	10.6		
6. OFF-RAMP LEFT QUEUE	26.7	-9.1	26.7	-383.7	375.	180.	AG	571.	100.0	0.0	3.0	2.03	62.4
7. OFF-RAMP RIGHT QUEUE	33.5	-7.6	31.6	-10.1	3.	217.	AG	76.	100.0	0.0	3.0	0.07	0.5
8. OFF-RAMP THRU QUEUE	23.6	-9.1	23.6	-16.1	7.	180.	AG	571.	100.0	0.0	3.0	0.54	1.2

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NORTHWEST CORNER	-18.3	10.7	1.8
2. RAILROAD YARD	27.4	10.7	1.8
3. OPEN FIELD	35.8	-11.4	1.8
4. W CORNER NEAR RAMP	19.1	-18.3	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 NO-BLD AM 8-HR #12 SOUTHAMPTON/I-93

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3	REC4
0.	3.1	3.0	3.4	3.6
10.	3.1	3.0	3.3	4.0
20.	3.1	3.0	3.3	4.4
30.	3.1	3.0	3.4	4.8
40.	3.2	3.0	3.4	5.0
50.	3.2	3.0	3.4	5.2
60.	3.2	3.1	3.5	5.3
70.	3.4	3.1	3.6	5.1
80.	3.5	3.3	3.6	5.0
90.	3.8	3.5	3.5	4.7
100.	3.9	3.6	3.3	4.3
110.	4.0	3.6	3.1	4.2
120.	4.0	3.6	3.1	4.2
130.	4.0	3.5	3.0	4.3
140.	3.9	3.6	3.0	4.5
150.	4.0	3.7	3.0	4.6
160.	4.0	4.2	3.2	4.8
170.	3.8	4.9	3.7	4.8
180.	3.6	5.4	4.3	4.5
190.	3.5	5.2	4.6	3.8
200.	3.4	4.5	4.6	3.2
210.	3.4	4.0	4.5	3.0
220.	3.5	3.7	4.4	3.0
230.	3.5	3.8	4.3	3.0
240.	3.6	3.9	4.4	3.0
250.	3.6	3.9	4.7	3.0
260.	3.7	4.1	4.8	3.1
270.	3.6	4.0	4.8	3.3
280.	3.4	3.8	4.8	3.4
290.	3.2	3.7	4.6	3.5
300.	3.1	3.5	4.2	3.4
310.	3.1	3.5	4.0	3.5
320.	3.1	3.4	4.0	3.6
330.	3.2	3.2	3.9	3.6
340.	3.1	3.1	3.7	3.6
350.	3.1	3.0	3.4	3.6
360.	3.1	3.0	3.4	3.6
MAX	4.0	5.4	4.8	5.3
DEGR.	110	180	260	60

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BUILD AM 1-HOUR GARAGE/ALBANY ST.
DATE: 04/25/91
TIME: 08:19:11

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 5.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1245.	24.8	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1425.	24.8	0.0	16.7		
3. GARAGE EXIT FRE FLOW	0.0	0.0	0.0	-499.9	500.	180.	AG	240.	33.8	0.0	15.1		
4. GARAGE EXIT LT QUEUE	0.0	-12.2	0.0	-15.3	3.	180.	AG	795.	100.0	0.0	3.0	0.32	0.5
5. GARAGE EXIT RT QUEUE	6.1	-12.2	6.1	-15.3	3.	180.	AG	22.	100.0	0.0	3.0	0.01	0.5

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NWEST SIDE RECEPTOR	0.0	10.7	1.8
2. EAST CORNER RECEPTOR	7.6	-10.7	1.8
3. SOUTH CRNER RECEPTOR	-7.6	-10.7	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BUILD AM 1-HOUR GARAGE/ALBANY ST.

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3
0.	5.0	6.0	6.1
10.	5.0	6.0	6.1
20.	5.0	5.9	6.2
30.	5.0	5.9	6.2
40.	5.0	6.0	6.2
50.	5.0	6.0	6.3
60.	5.1	6.2	6.4
70.	5.2	6.3	6.6
80.	5.6	6.4	6.8
90.	6.1	6.1	6.7
100.	6.4	5.6	6.3
110.	6.3	5.2	6.0
120.	6.2	5.1	5.8
130.	6.0	5.0	5.7
140.	6.0	5.0	5.6
150.	6.0	5.1	5.5
160.	6.2	5.1	5.4
170.	6.3	5.2	5.5
180.	6.4	5.4	5.4
190.	6.4	5.5	5.2
200.	6.3	5.4	5.1
210.	6.1	5.5	5.1
220.	6.1	5.6	5.0
230.	6.2	5.7	5.0
240.	6.3	5.8	5.1
250.	6.5	6.0	5.2
260.	6.6	6.4	5.7
270.	6.3	6.9	6.3
280.	5.7	7.0	6.6
290.	5.2	6.8	6.5
300.	5.1	6.5	6.3
310.	5.0	6.4	6.2
320.	5.0	6.3	6.1
330.	5.0	6.2	6.0
340.	5.0	6.2	6.0
350.	5.0	6.0	6.1
360.	5.0	6.0	6.1
MAX	6.6	7.0	6.8
DEGR.	260	280	80

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BUILD AM 8-HOUR GARAGE/ALBANY ST.
DATE: 04/25/91
TIME: 08:19:40

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 850. M AMB = 3.0 PPM

LINK VARIABLES

LINK DESCRIPTION	LINK COORDINATES (M) X1	Y1	X2	Y2	LENGTH (M)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (M)	W (M)	V/C	QUEUE (VEH)
1. ALBANY ST. NORTH FF	0.0	0.0	499.9	0.0	500.	90.	AG	1058.	12.5	0.0	16.7		
2. ALBANY ST. SOUTH FF	0.0	0.0	-499.9	0.0	500.	270.	AG	1211.	12.5	0.0	16.7		
3. GARAGE EXIT FRE FLOW	0.0	0.0	0.0	-499.9	500.	180.	AG	204.	21.4	0.0	15.1		
4. GARAGE EXIT LT QUEUE	0.0	-12.2	0.0	-15.3	3.	180.	AG	201.	100.0	0.0	3.0	0.16	0.5
5. GARAGE EXIT RT QUEUE	6.1	-12.2	6.1	-15.3	3.	180.	AG	12.	100.0	0.0	3.0	0.01	0.5

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (M) X	Y	Z
1. NWEST SIDE RECEPTOR	0.0	10.7	1.8
2. EAST CORNER RECEPTOR	7.6	-10.7	1.8
3. SOUTH CRNER RECEPTOR	-7.6	-10.7	1.8

JOB: UNIVERSITY ASSOCIATES - BOSTON MA RUN: 2000 BUILD AM 8-HOUR GARAGE/ALBANY ST.

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC1	REC2	REC3
0.	3.0	3.5	3.5
10.	3.0	3.4	3.5
20.	3.0	3.4	3.5
30.	3.0	3.4	3.6
40.	3.0	3.4	3.5
50.	3.0	3.4	3.6
60.	3.0	3.5	3.6
70.	3.1	3.6	3.7
80.	3.3	3.6	3.8
90.	3.5	3.5	3.6
100.	3.6	3.3	3.4
110.	3.6	3.1	3.3
120.	3.5	3.0	3.2
130.	3.4	3.0	3.3
140.	3.4	3.0	3.3
150.	3.4	3.0	3.2
160.	3.5	3.1	3.2
170.	3.5	3.1	3.2
180.	3.6	3.2	3.2
190.	3.6	3.2	3.1
200.	3.5	3.2	3.1
210.	3.5	3.2	3.0
220.	3.4	3.3	3.0
230.	3.5	3.3	3.0
240.	3.6	3.2	3.0
250.	3.7	3.3	3.1
260.	3.7	3.5	3.3
270.	3.5	3.7	3.5
280.	3.3	3.9	3.7
290.	3.1	3.7	3.7
300.	3.0	3.6	3.6
310.	3.0	3.6	3.5
320.	3.0	3.6	3.5
330.	3.0	3.5	3.4
340.	3.0	3.5	3.4
350.	3.0	3.5	3.4
360.	3.0	3.5	3.5
MAX	3.7	3.9	3.8
DEGR.	250	280	80

APPENDIX C

MOBILE4 OUTPUT

M 22 Warning: 0.137E-01 mileage with zero registration
M108 Warning: The ATP compliance rate of 50.0 is not equal to the I/M compliance rate of 85.0

I/M program selected:

Start year (January 1):	1983
Pre-1981 MYR stringency rate:	13%
First model year covered:	1972
Last model year covered:	2000
Waiver rate (pre-1981):	1.%
Waiver rate (1981 and newer):	1.%
Compliance Rate:	85.%
Inspection type:	Computerized decentralized
Inspection frequency	Annual
Vehicle types covered:	LDGV - Yes
	LDGT1 - Yes
	LDGT2 - Yes
	HDGV - No
1981 & later MYR test type:	Idle

Anti-tampering program selected:

Start year (January 1):	1985
First model year covered:	1980
Last model year covered:	2000
Vehicle types covered:	LDGV , LDGT1, LDGT2
Type:	Decentralized
Frequency:	Annual
Compliance Rate:	50.0%
Air pump system disablements:	No
Catalyst removals:	Yes
Fuel inlet restrictor disablements:	Yes
Tailpipe lead deposit test:	No
EGR disablement:	No
Evaporative system disablements:	No
PCV system disablements:	No
Missing gas caps:	No

BOSTON MASS. ASTM Class: C Minimum Temp: 75. (F) Maximum Temp: 75. (F)
Base RVP: 11.5 In-use RVP: 9.0 In-use Start Yr: 1989

Total HC emission factors include evaporative HC emission factors.

User supplied veh registration distributions.

Cal. Year: 2000 I/M Program: Yes Ambient Temp: 75.0 (F) Region: Low
Anti-tam. Program: Yes Operating Mode: 0.0 / 0.0 / 0.0 Altitude: 500. Ft.

Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
VMT Mix:	0.709	0.110	0.081		0.013	0.038	0.016	0.023	0.010	
Composite Emission Factors (Gm/Mile)										
Exhaust CO:	16.61	31.86	33.05	32.36	104.48	3.42	3.79	36.69	122.35	21.588
Hot Stabilized Idle Emission Factors (Gm/Hr)										
Idle CO:	56.01	128.36	134.06	130.77	263.75	12.44	22.23	51.81	160.73	71.794

M 22 Warning: 0.137E-01 mileage with zero registration
M108 Warning: The ATP compliance rate of 50.0 is not equal to the I/M compliance rate of 85.0
M 83 Comment: One or more evaporative temperatures (input daily maximum, input ambient, calculated hot soak, and/or calculated running loss) is 40F or less, or input daily minimum is 25F or less; no evaporative emission factors (hot soak, diurnal, running loss, or refueling loss) will be calculated.

I/M program selected:

Start year (January 1):	1983
Pre-1981 MYR stringency rate:	13%
First model year covered:	1972
Last model year covered:	2000
Waiver rate (pre-1981):	1.%
Waiver rate (1981 and newer):	1.%
Compliance Rate:	85.%
Inspection type:	Computerized decentralized
Inspection frequency	Annual
Vehicle types covered:	LDGV - Yes
	LDGT1 - Yes
	LDGT2 - Yes
	HDGV - No
1981 & later MYR test type:	Idle

Anti-tampering program selected:

Start year (January 1):	1985
First model year covered:	1980
Last model year covered:	2000
Vehicle types covered:	LDGV , LDGT1, LDGT2
Type:	Decentralized
Frequency:	Annual
Compliance Rate:	50.0%
Air pump system disablements:	No
Catalyst removals:	Yes
Fuel inlet restrictor disablements:	Yes
Tailpipe lead deposit test:	No
EGR disablement:	No
Evaporative system disablements:	No
PCV system disablements:	No
Missing gas caps:	No

BOSTON MASS. ASTM Class: C Minimum Temp: 30. (F) Maximum Temp: 30. (F)
Base RVP: 11.5 In-use RVP: 9.0 In-use Start Yr: 1989

Total HC emission factors include evaporative HC emission factors.

User supplied veh registration distributions.

Cal. Year: 2000 I/M Program: Yes Ambient Temp: 30.0 (F) Region: Low
Anti-tam. Program: Yes Operating Mode: 50.0 / 10.0 / 50.0 Altitude: 500. Ft.

Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
VMT Mix:	0.709	0.110	0.081		0.013	0.038	0.016	0.023	0.010	
Composite Emission Factors (Gm/Mile)										
Exhaust CO:	95.49	137.11	138.36	137.64	134.95	5.12	5.72	36.69	362.55	100.531
Hot Stabilized Idle Emission Factors (Gm/Hr)										
Idle CO:	56.01	128.36	134.06	130.77	263.75	12.44	22.23	51.81	160.73	71.794

M 83 Comment: One or more evaporative temperatures (input daily maximum, input ambient, calculated hot soak, and/or calculated running loss) is 40F or less, or input daily minimum is 25F or less; no evaporative emission factors (hot soak, diurnal, running loss, or refueling loss) will be calculated.

User supplied veh registration distributions.

Cal. Year: 2000 I/M Program: Yes Ambient Temp: 30.0 (F) Region: Low
Anti-tam. Program: Yes Operating Mode: 50.0 / 10.0 / 50.0 Altitude: 500. Ft.

Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT Mix:	0.709	0.110	0.081		0.013	0.038	0.016	0.023	0.010	

Composite Emission Factors (Gm/Mile)
Exhaust CO: 33.46 43.14 43.97 43.49 50.43 2.08 2.33 14.90 65.17 33.803

Hot Stabilized Idle Emission Factors (Gm/Hr)
Idle CO: 56.01 125.36 134.06 130.77 263.75 12.44 22.23 51.81 160.73 71.794

M 93 Comment: One or more evaporative temperatures (input daily maximum, input ambient, calculated hot soak, and/or calculated running loss) is 40F or less, or input daily minimum is 25F or less; no evaporative emission factors (hot soak, diurnal, running loss, or refueling loss) will be calculated.

User supplied veh registration distributions.

Cal. Year: 2000 I/M Program: Yes Ambient Temp: 30.0 (F) Region: Low
Anti-tam. Program: Yes Operating Mode: 50.0 / 10.0 / 50.0 Altitude: 500. Ft.

Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT Mix:	0.709	0.110	0.081		0.013	0.038	0.016	0.023	0.010	

Composite Emission Factors (Gm/Mile)
Exhaust CO: 24.96 31.53 32.01 31.82 29.39 1.04 1.39 8.90 39.06 24.825

Hot Stabilized Idle Emission Factors (Gm/Hr)
Idle CO: 56.01 125.36 134.06 130.77 263.75 12.44 22.23 51.81 160.73 71.794

M 93 Comment: One or more evaporative temperatures (input daily maximum, input ambient, calculated hot soak, and/or calculated running loss) is 40F or less, or input daily minimum is 25F or less; no evaporative emission factors (hot soak, diurnal, running loss, or refueling loss) will be calculated.

User supplied veh registration distributions.

Cal. Year: 2000 I/M Program: Yes Ambient Temp: 30.0 (F) Region: Low
Anti-tam. Program: Yes Operating Mode: 50.0 / 10.0 / 50.0 Altitude: 500. Ft.

Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	30.0	30.0	30.0		30.0	30.0	30.0	30.0	30.0	
VMT Mix:	0.709	0.110	0.081		0.013	0.038	0.016	0.023	0.010	

Composite Emission Factors (Gm/Mile)
Exhaust CO: 20.80 26.28 26.84 26.51 24.36 1.03 1.15 7.36 31.88 20.677

Hot Stabilized Idle Emission Factors (Gm/Hr)
Idle CO: 56.01 125.36 134.06 130.77 263.75 12.44 22.23 51.81 160.73 71.794

M 93 Comment: One or more evaporative temperatures (input daily maximum, input ambient, calculated hot soak, and/or calculated running loss) is 40F or less, or input daily minimum is 25F or less; no evaporative emission factors (hot soak, diurnal, running loss, or refueling loss) will be calculated.

User supplied veh registration distributions.

Cal. Year: 2000 I/M Program: Yes Ambient Temp: 30.0 (F) Region: Low
Anti-tam. Program: Yes Operating Mode: 20.6 / 27.3 / 20.6 Altitude: 500. Ft.

Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	2.5	2.5	2.5		2.5	2.5	2.5	2.5	2.5	
VMT Mix:	0.709	0.110	0.081		0.013	0.038	0.016	0.023	0.010	

Composite Emission Factors (Gm/Mile)
Exhaust CO: 57.86 92.81 94.53 93.54 134.95 4.40 5.02 36.69 234.72 64.104

Hot Stabilized Idle Emission Factors (Gm/Hr)
Idle CO: 56.01 125.36 134.06 130.77 263.75 12.44 22.23 51.81 160.73 71.794

M 93 Comment: One or more evaporative temperatures (input daily maximum, input ambient, calculated hot soak, and/or calculated running loss) is 40F or less, or input daily minimum is 25F or less; no evaporative emission factors (hot soak, diurnal, running loss, or refueling loss) will be calculated.

User supplied veh registration distributions.

Cal. Year: 2000 I/M Program: Yes Ambient Temp: 30.0 (F) Region: Low
Anti-tam. Program: Yes Operating Mode: 20.6 / 27.3 / 20.6 Altitude: 500. Ft.

Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	15.0	15.0	15.0		15.0	15.0	15.0	15.0	15.0	
VMT Mix:	0.709	0.110	0.081		0.013	0.038	0.016	0.023	0.010	

Composite Emission Factors (Gm/Mile)

Exhaust CO:	20.11	28.92	29.79	29.29	50.43	1.79	2.04	14.90	42.19	21.378

Hot Stabilized Idle Emission Factors (Gm/Hr)

Idle CO:	56.01	128.36	134.06	130.77	263.75	12.44	22.23	51.81	160.73	71.794

M 83 Comment: One or more evaporative temperatures (input daily maximum, input ambient, calculated hot soak, and/or calculated running loss) is 40F or less, or input daily minimum is 25F or less; no evaporative emission factors (hot soak, diurnal, running loss, or refueling loss) will be calculated.

User supplied veh registration distributions.

Cal. Year: 2000 I/M Program: Yes Ambient Temp: 30.0 (F) Region: Low
Anti-tam. Program: Yes Operating Mode: 20.6 / 27.3 / 20.6 Altitude: 500. Ft.

Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	25.0	25.0	25.0		25.0	25.0	25.0	25.0	25.0	
VMT Mix:	0.709	0.110	0.081		0.013	0.038	0.016	0.023	0.010	

Composite Emission Factors (Gm/Mile)

Exhaust CO:	14.38	20.32	20.98	20.60	29.39	1.07	1.22	8.90	25.28	15.030

Hot Stabilized Idle Emission Factors (Gm/Hr)

Idle CO:	56.01	128.36	134.06	130.77	263.75	12.44	22.23	51.81	160.73	71.794

M 83 Comment: One or more evaporative temperatures (input daily maximum, input ambient, calculated hot soak, and/or calculated running loss) is 40F or less, or input daily minimum is 25F or less; no evaporative emission factors (hot soak, diurnal, running loss, or refueling loss) will be calculated.

User supplied veh registration distributions.

Cal. Year: 2000 I/M Program: Yes Ambient Temp: 30.0 (F) Region: Low
Anti-tam. Program: Yes Operating Mode: 20.6 / 27.3 / 20.6 Altitude: 500. Ft.

Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	30.0	30.0	30.0		30.0	30.0	30.0	30.0	30.0	
VMT Mix:	0.709	0.110	0.081		0.013	0.038	0.016	0.023	0.010	

Composite Emission Factors (Gm/Mile)

Exhaust CO:	11.98	16.94	17.48	17.17	24.36	0.88	1.01	7.36	20.64	12.517

Hot Stabilized Idle Emission Factors (Gm/Hr)

Idle CO:	56.01	128.36	134.06	130.77	263.75	12.44	22.23	51.81	160.73	71.794

M 83 Comment: One or more evaporative temperatures (input daily maximum, input ambient, calculated hot soak, and/or calculated running loss) is 40F or less, or input daily minimum is 25F or less; no evaporative emission factors (hot soak, diurnal, running loss, or refueling loss) will be calculated.

User supplied veh registration distributions.

Cal. Year: 2000 I/M Program: Yes Ambient Temp: 30.0 (F) Region: Low
Anti-tam. Program: Yes Operating Mode: 20.6 / 27.3 / 20.6 Altitude: 500. Ft.

Veh. Type:	LDGV	LDGT1	LDGT2	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Veh. Speeds:	35.0	35.0	35.0		35.0	35.0	35.0	35.0	35.0	
VMT Mix:	0.709	0.110	0.081		0.013	0.038	0.016	0.023	0.010	

Composite Emission Factors (Gm/Mile)

Exhaust CO:	10.27	14.52	14.98	14.71	21.34	0.76	0.87	6.37	17.19	10.732

Hot Stabilized Idle Emission Factors (Gm/Hr)

Idle CO:	56.01	128.36	134.06	130.77	263.75	12.44	22.23	51.81	160.73	71.794

APPENDIX D

WORK SHEETS FOR DETERMINING CAPACITIES FOR TURNING MOVEMENTS AT UNSIGNALIZED INTERSECTIONS

#2

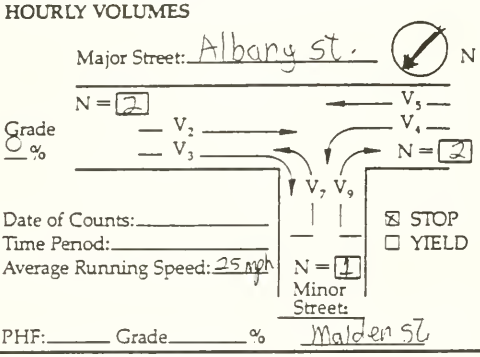
WORKSHEET FOR ANALYSIS OF T-INTERSECTIONS

LOCATION: Malden st./Albany st.

NAME: 2000 Build 1-hr PM

HOURLY VOLUMES

Major Street: Albany st.



Date of Counts: _____

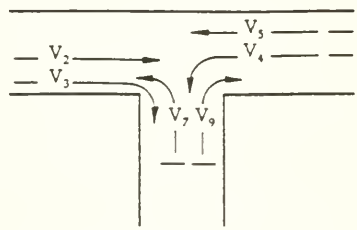
Time Period: _____

Average Running Speed: 25 mph

☒ STOP
☐ YIELD

PHF: _____ Grade _____ %

VOLUMES IN PCPH



VOLUME ADJUSTMENTS

Movement No.	2	3	4	5	7	9
Volume (vph)	610	240	120	980	270	10
Vol. (pcph), see Table 10-1			132		297	11

STEP 1: RT from Minor Street	V_9
Conflicting Flow, V_c	$1/2\ V_3 + V_2 =$ 120 + 610 = 730 vph (V_{c9})
Critical Gap, T_c, and Potential Capacity, c_p	$T_c =$ 5.0 sec (Table 10-2) $c_{p9} =$ 545 pcph (Fig. 10-3)
Actual Capacity, c_m	$c_{m9} = c_{p9} =$ 545 pcph

STEP 2: LT From Major Street	V_4
Conflicting Flow, V_c	$V_3 + V_2 =$ 240 + 610 = 850 vph (V_{c4})
Critical Gap, T_c, and Potential Capacity, c_p	$T_c =$ 5.0 sec (Table 10-2) $c_{p4} =$ 465 pcph (Fig. 10-3)
Percent of c_p Utilized and Impedance Factor (Fig. 10-5)	$(v_4/c_{p4}) \times 100 =$ 28.4% $P_4 =$ 0.78
Actual Capacity, c_m	$c_{m4} = c_{p4} =$ 465 pcph

STEP 3: LT From Minor Street	V_7
Conflicting Flow, V_c	$1/2\ V_3+V_2+V_5+V_4 =$ 120 + 610 + 980 + 120 = 1830 vph (V_{c7})
Critical Gap, T_c, and Potential Capacity, c_p	$T_c =$ 6.5 sec (Table 10-2) $c_{p7} =$ 55 pcph (Fig. 10-3)
Actual Capacity, c_m	$c_{m7} = c_{p7} \times P_4 =$ 55 × 0.78 = 43 pcph

SHARED-LANE CAPACITY

$$SH = \frac{v_7 + v_9}{(v_7/c_{m7}) + (v_9/c_{m9})} \text{ if lane is shared}$$

Movement No.	v(pcph)	c_m (pcph)	c_{SH} (pcph)	c_R	LOS
7	297	43	44		
9	11	545			
4					

#2

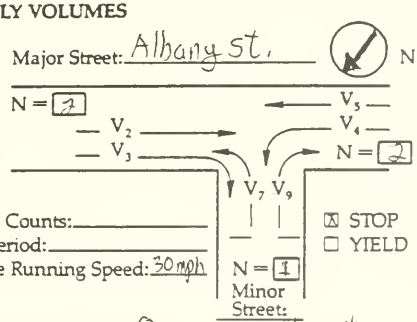
WORKSHEET FOR ANALYSIS OF T-INTERSECTIONS

LOCATION: Malden st./Albany st.

NAME: 2000 Build 8-hour PM

HOURLY VOLUMES

Major Street: Albany st.



Date of Counts:

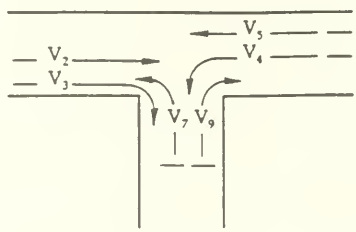
Time Period:

Average Running Speed: 30 mph

☒ STOP
☐ YIELD

PHF: Grade 0 %

VOLUMES IN PCPH



8-hour = 1-hour X 0.85

VOLUME ADJUSTMENTS

Movement No.	2	3	4	5	7	9
Volume (vph)	519	204	102	833	230	9
Vol. (pcph), see Table 10-1			112		252	10

STEP 1: RT from Minor Street — V_9

Conflicting Flow, V_c: $1/2\ V_3 + V_2 =$ 102 + 519 = 621 vph (V_{c9})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p9} =$ 610 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m9} = c_{p9} =$ 610 pcph

STEP 2: LT From Major Street — V_4

Conflicting Flow, V_c: $V_3 + V_2 =$ 204 + 519 = 723 vph (V_{c4})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p4} =$ 545 pcph (Fig. 10-3)

Percent of c_p Utilized and Impedance Factor (Fig. 10-5): $(v_4/c_{p4}) \times 100 =$ 206% $P_4 =$ 0.85

Actual Capacity, c_m: $c_{m4} = c_{p4} =$ 545 pcph

STEP 3: LT From Minor Street — V_7

Conflicting Flow, V_c: $1/2\ V_3+V_2+V_5+V_4 =$ 102 + 519 + 833 + 102 = 1556 vph (V_{c7})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 6.5 sec (Table 10-2) $c_{p7} =$ 100 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m7} = c_{p7} \times P_4 =$ 100 × 0.85 = 85 pcph

SHARED-LANE CAPACITY

$$SH = \frac{v_7 + v_9}{(v_7/c_{m7}) + (v_9/c_{m9})} \text{ if lane is shared}$$

Movement No.	v(pcph)	c_m (pcph)	c_{SH} (pcph)	c_R	LOS
7	252	85	88		
9	10	610			
4					

#2

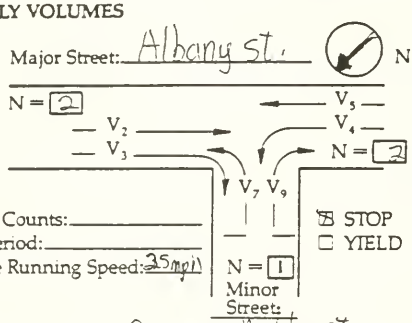
WORKSHEET FOR ANALYSIS OF T-INTERSECTIONS

LOCATION: Malden st./Albany St.

NAME: 2000 - No-Build 1-hour PM

HOURLY VOLUMES

Major Street: Albany st.



Grade 0%

Date of Counts: _____

Time Period: _____

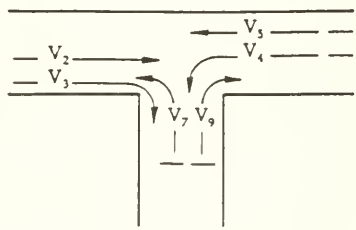
Average Running Speed: 35 mph

☒ STOP
☐ YIELD

Minor Street: Malden St.

PHF: _____ Grade 0 %

VOLUMES IN PCPH



VOLUME ADJUSTMENTS

Movement No.	2	3	4	5	7	9
Volume (vph)	600	240	115	835	270	10
Vol. (pcph), see Table 10-1			127		297	11

STEP 1: RT from Minor Street — V_9

Conflicting Flow, V_c: $1/2\ V_3 + V_2 =$ 120 + 600 = 720 vph (V_{c9})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p9} =$ 550 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m9} = c_{p9} =$ 550 pcph

STEP 2: LT From Major Street — V_4

Conflicting Flow, V_c: $V_3 + V_2 =$ 240 + 600 = 840 vph (V_{c4})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p4} =$ 465 pcph (Fig. 10-3)

Percent of c_p Utilized and Impedance Factor (Fig. 10-5): $(v_4/c_{p4}) \times 100 =$ 273% $P_4 =$ 0.8

Actual Capacity, c_m: $c_{m4} = c_{p4} =$ 465 pcph

STEP 3: LT From Minor Street — V_7

Conflicting Flow, V_c: $1/2\ V_3+V_2+V_5+V_4 =$ 120 + 600 + 835 + 115 = 1670 vph (V_{c7})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 6.5 sec (Table 10-2) $c_{p7} =$ 80 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m7} = c_{p7} \times P_4 =$ 80 × 0.8 = 64 pcph

SHARED-LANE CAPACITY

$$SH = \frac{v_7 + v_9}{(v_7/c_{m7}) + (v_9/c_{m9})} \text{ if lane is shared}$$

Movement No.	v(pcph)	c_m (pcph)	c_{SH} (pcph)	c_R	LOS
7	297	64	66		
9	11	550			
4					

#2

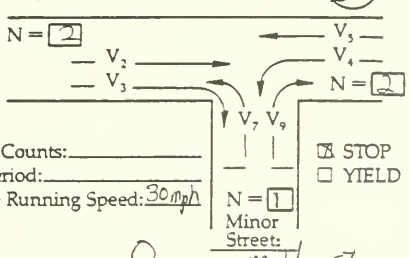
WORKSHEET FOR ANALYSIS OF T-INTERSECTIONS

LOCATION: Malden St./Albany St.

NAME: 2000 No-Build 8-hr PM

HOURLY VOLUMES

Major Street: Albany St.



Date of Counts: _____

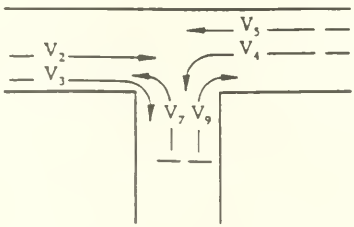
Time Period: _____

Average Running Speed: 30 mph

☒ STOP
☐ YIELD

PHF: _____ Grade 0 %

VOLUMES IN PCPH



8-hour = 1-hour X 0.85

VOLUME ADJUSTMENTS

Movement No.	2	3	4	5	7	9
Volume (vph)	510	204	98	710	230	9
Vol. (pcph), see Table 10-1			108		252	10

STEP 1: RT from Minor Street — V_9

Conflicting Flow, V_c: $1/2\ V_3 + V_2 =$ 102 + 510 = 612 vph (V_{c9})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p9} =$ 620 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m9} = c_{p9} =$ 620 pcph

STEP 2: LT From Major Street — V_4

Conflicting Flow, V_c: $V_3 + V_2 =$ 204 + 510 = 714 vph (V_{c4})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p4} =$ 550 pcph (Fig. 10-3)

Percent of c_p Utilized and Impedance Factor (Fig. 10-5): $(v_4/c_{p4}) \times 100 =$ 19.6% $P_4 =$ 0.86

Actual Capacity, c_m: $c_{m4} = c_{p4} =$ 550 pcph

STEP 3: LT From Minor Street — V_7

Conflicting Flow, V_c: $1/2\ V_3 + V_2 + V_5 + V_4 =$ 102 + 510 + 710 + 98 = 1420 vph (V_{c7})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 6.5 sec (Table 10-2) $c_{p7} =$ 125 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m7} = c_{p7} \times P_4 =$ 125 × 0.86 = 108 pcph

SHARED-LANE CAPACITY

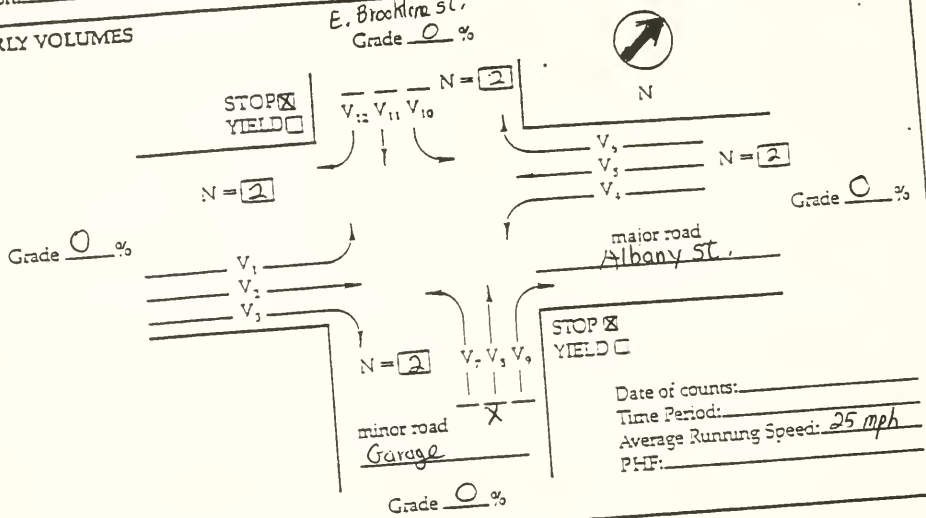
$$SH = \frac{v_7 + v_9}{(v_7/c_{m7}) + (v_9/c_{m9})} \text{ if lane is shared}$$

Movement No.	v(pcph)	c_m (pcph)	c_{SH} (pcph)	c_R	LOS
7	252	108	112		
9	10	620			
4					

#3 WORKSHEET FOR FOUR-LEG INTERSECTIONS

Location: E. Brookline St./Albany St./Garage Name: 2000 Build 1-hour AM

HOURLY VOLUMES

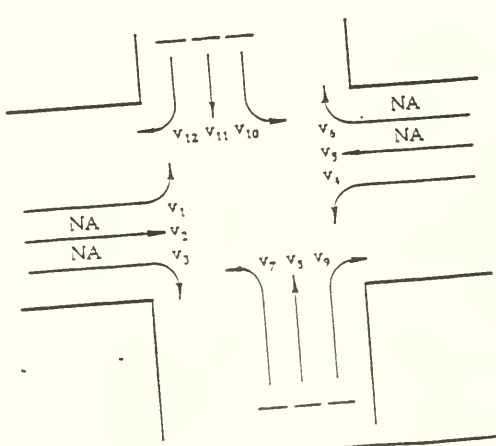


Date of counts:
Time Period:
Average Running Speed: 25 mph
PHF:

VOLUME ADJUSTMENTS

Movement No.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	0	560	295	265	445	0	20	0	15	65	10	105
Vol. (pcph), see Table 10-1	0			292			22	0	17	72	11	116

VOLUMES IN PCPH



E. Broadway St./ Albany St.

WORKSHEET FOR FOUR-LEG INTERSECTIONS

1-hr AM

STEP 1: RT From Minor Street	V_9	V_{12}
Conflicting Flows, V_c	$1/2\ V_3 + V_2 = V_{c9}$ 148 + 560 = 708 vph	$1/2\ V_6 + V_5 = V_{c12}$ 0 + 445 = 445 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p9} = 550 pcph	c_{p12} = 745 pcph
Percent of c_p Utilized	$(v_9/c_{p9}) \times 100$ = 3.1 %	$(v_{12}/c_{p12}) \times 100$ = 15.6 %
Impedance Factor, P (Fig. 10-5)	P_9 = 0.97	P_{12} = 0.89
Actual Capacity, c_m	$c_{m9} = c_{p9}$ = 550 pcph	$c_{m12} = c_{p12}$ = 745 pcph

STEP 2: LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3 + V_2 = V_{c4}$ 295 + 560 = 855 vph	$V_6 + V_5 = V_{c1}$ 0 + 445 = 445 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p4} = 465 pcph	c_{p1} = 745 pcph
Percent of c_p Utilized	$(v_4/c_{p4}) \times 100$ = 62.8 %	$(v_1/c_{p1}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_4 = 0.45	P_1 = 1.0
Actual Capacity, c_m	$c_{m4} = c_{p4}$ = 465 pcph	$c_{m1} = c_{p1}$ = 745 pcph

STEP 3: TH From Minor Street	V_8	V_{11}
Conflicting Flows, V_c	$1/2V_3 + V_2 + V_1 + V_6 + V_5 + V_4 = V_{c8}$ 148 + 560 + 0 + 0 + 445 + 265 = 1418 vph	$1/2V_6 + V_5 + V_4 + V_3 + V_2 + V_1 = V_{c11}$ 0 + 445 + 265 + 295 + 560 + 0 = 1565 vph
Critical Gap, T_c (Tab. 10-2)	6.0 (sec)	6.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p8} = 150 pcph	c_{p11} = 125 pcph
Percent of c_p Utilized	$(v_8/c_{p8}) \times 100$ = 0 %	$(v_{11}/c_{p11}) \times 100$ = 8.8 %
Impedance Factor, P (Fig. 10-5)	P_8 = 1.0	P_{11} = 0.94
Actual Capacity, c_m	$c_{m8} = c_{p8} \times P_1 \times P_4$ 68 = 150 × 1.0 × 0.45 (pcph)	$c_{m11} = c_{p11} \times P_1 \times P_4$ 56 = 125 × 1.0 × 0.45 (pcph)

STEP 4: LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_{c8} (step 3) + V_{11} + V_{12} = V_{c7} 1418 + 10 + 105 = 1533 vph	V_{c11} (step 3) + V_9 + V_8 = V_{c10} 1565 + 0 + 15 = 1580 vph
Critical Gap, T_c (Tab. 10-2)	6.5 (sec)	6.5 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p7} = 110 pcph	c_{p10} = 100 pcph
Actual Capacity, c_m	$c_{m7} = c_{p7} \times P_1 \times P_4 \times P_{11} \times P_{12}$ 41 = 110 × 1.0 × 0.45 × 0.94 × 0.89 (pcph)	$c_{m10} = c_{p10} \times P_1 \times P_4 \times P_8 \times P_9$ 44 = 100 × 0.45 × 1.0 × 1.0 × 0.97 (pcph)

#3 E. Brookline St. WORKSHEET FOR FOUR-LEG INTERSECTIONS

Albany St. SHARED-LANE CAPACITY 2000 Build 1-hour AM

$$c_{SH} = \frac{v_i + v_j}{(v_i/c_{mi}) + (v_j/c_{mj})}$$ where 2 movements share a lane

$$c_{SH} = \frac{v_i + v_j + v_k}{(v_i/c_{mi}) + (v_j/c_{mj}) + (v_k/c_{mk})}$$ where 3 movements share a lane

MINOR STREET APPROACH MOVEMENTS 7, 3, 9

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
7					
8					
9					

MINOR STREET APPROACH MOVEMENTS 10, 11, 12 E. Brookline St

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
10	72	44	45		
11	11	56			
12					

MAJOR STREET LEFT TURNS 1, 4

Movement	v (pcph)	c_m (pcph)	$c_R = c_m - v$	LOS
1				
4				

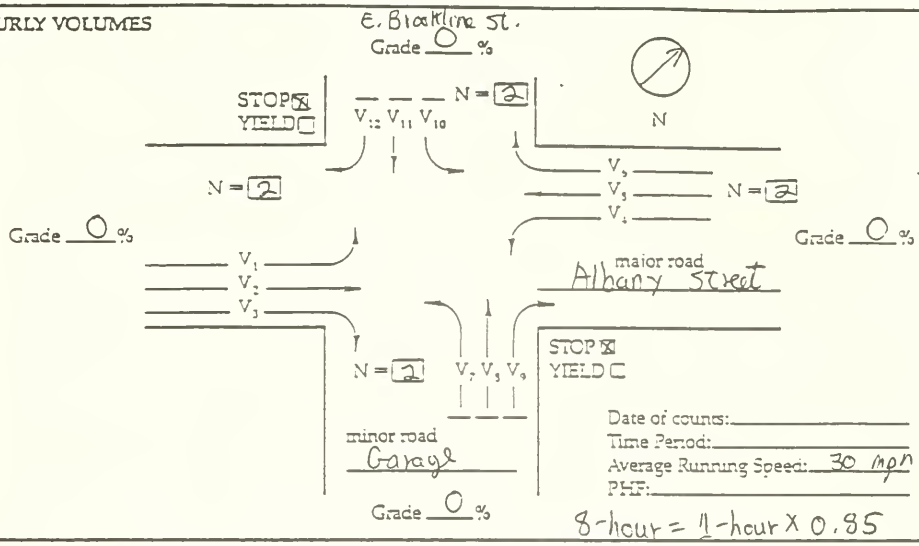
COMMENTS:

#3

WORKSHEET FOR FOUR-LEG INTERSECTIONS

Location: E. Brookline St./Albany St./Garage Name: 2000 Build 8-hour AM

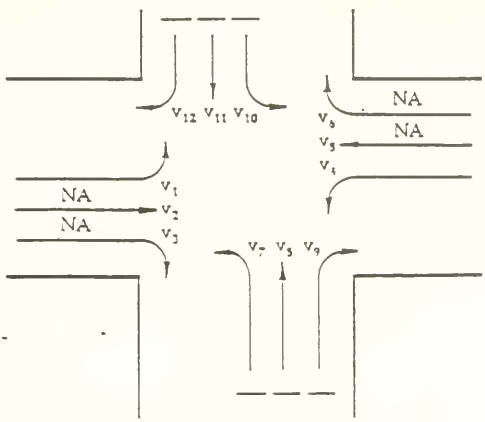
HOURLY VOLUMES



VOLUME ADJUSTMENTS

Movement No.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	0	476	251	225	378	0	17	0	13	55	11	89
Vol. (pcph), see Table 10-1	0			248			19	0	14	61	12	98

VOLUMES IN PCPH



E. Brookline St / Albany St.

WORKSHEET FOR FOUR-LEG INTERSECTIONS

8-hr AM

Page 2

STEP 1: RT From Minor Street	V_9	V_{12}
Conflicting Flows, V_c	$1/2\ V_3 + V_2 = V_{c9}$ 126 + 476 = 602 vph	$1/2\ V_6 + V_5 = V_{c12}$ 0 + 378 = 378 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p9} = 625 pcph	c_{p12} = 820 pcph
Percent of c_p Utilized	$(v_9/c_{p9}) \times 100$ = 2.2 %	$(v_{12}/c_{p12}) \times 100$ = 12.0 %
Impedance Factor, P (Fig. 10-5)	P_9 = 0.98	P_{12} = 0.92
Actual Capacity, c_m	$c_{m9} = c_{p9}$ = 625 pcph	$c_{m12} = c_{p12}$ = 820 pcph
STEP 2: LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3 + V_2 = V_{c4}$ 251 + 476 = 727 vph	$V_6 + V_5 = V_{c1}$ 0 + 378 = 378 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p4} = 727 pcph	c_{p1} = 820 pcph
Percent of c_p Utilized	$(v_4/c_{p4}) \times 100$ = 34.1 %	$(v_1/c_{p1}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_4 = 0.74	P_1 = 1.0
Actual Capacity, c_m	$c_{m4} = c_{p4}$ = 727 pcph	$c_{m1} = c_{p1}$ = 820 pcph
STEP 3: TH From Minor Street	V_8	V_{11}
Conflicting Flows, V_c	$1/2V_3 + V_2 + V_1 + V_9 + V_3 + V_4 = V_{c8}$ 126 + 476 + 0 + 0 + 378 + 225 = 1205 vph	$1/2V_6 + V_5 + V_4 + V_7 + V_2 + V_1 = V_{c11}$ 0 + 378 + 225 + 251 + 476 + 0 = 1330 vph
Critical Gap, T_c (Tab. 10-2)	6.0 (sec)	6.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p8} = 200 pcph	c_{p11} = 170 pcph
Percent of c_p Utilized	$(v_8/c_{p8}) \times 100$ = 0 %	$(v_{11}/c_{p11}) \times 100$ = 7.1 %
Impedance Factor, P (Fig. 10-5)	P_8 = 1.0	P_{11} = 0.96
Actual Capacity, c_m	$c_{m8} = c_{p8} \times P_1 \times P_4$ 148 = 200 × 1.0 × 0.74 (pcph)	$c_{m11} = c_{p11} \times P_1 \times P_4$ 126 = 170 × 1.0 × .74 (pcph)
STEP 4: LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_{c8} (step 3) − V_{11} − V_{12} = V_{c7} 1205 − 12 − 89 = 1306 vph	V_{c11} (step 3) − V_9 − V_8 = V_{c10} 1330 − 0 − 14 = 1344 vph
Critical Gap, T_c (Tab. 10-2)	6.5 (sec)	6.5 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p7} = 140 pcph	c_{p10} = 135 pcph
Actual Capacity, c_m	$c_{m7} = c_{p7} \times P_1 \times P_4 \times P_{11} \times P_{12}$ 91 = 140 × 1.0 × 0.74 × 0.96 × 0.92 pcph)	$c_{m10} = c_{p10} \times P_2 \times P_1 \times P_3 \times P_9$ 98 = 135 × 0.74 × 1.0 × 1.0 × 0.98 pcph)

E. Brookline St. | WORKSHEET FOR FOUR-LEG INTERSECTIONS | Page 3

Albany St. | SHARED-LANE CAPACITY | 2000 Build 8-hour AM

$$c_{SH} = \frac{v_i + v_j}{(v_i/c_{mi}) + (v_j/c_{mj})}$$ where 2 movements share a lane

$$c_{SH} = \frac{v_i + v_j + v_k}{(v_i/c_{mi}) + (v_j/c_{mj}) + (v_k/c_{mk})}$$ where 3 movements share a lane

MINOR STREET APPROACH MOVEMENTS 7, 3, 9

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
7					
8					
9					

MINOR STREET APPROACH MOVEMENTS 10, 11, 12 E. Brookline St.

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
10	61	98	102		
11	12	126			
12					

MAJOR STREET LEFT TURNS 1, 4

Movement	v (pcph)	c_m (pcph)	$c_R = c_m - v$	LOS
1				
4				

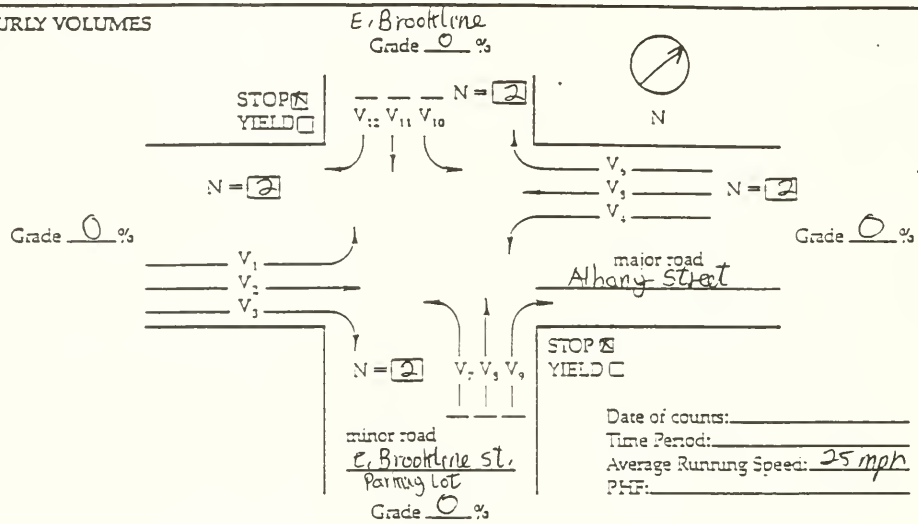
COMMENTS:

#3

WORKSHEET FOR FOUR-LEG INTERSECTIONS

Location: E. Brookline Street/Albany St. Name: 2000 No-Build 1-hr AM

HOURLY VOLUMES



Date of counts: _____

Time Period: _____

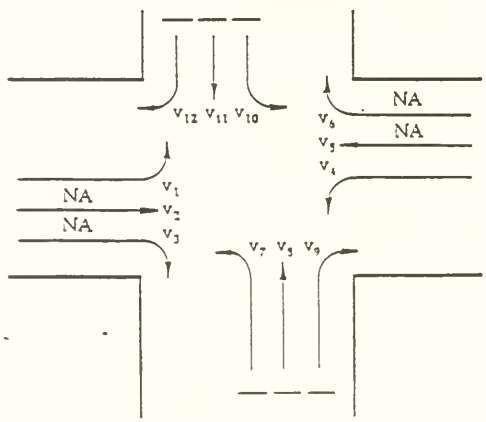
Average Running Speed: 25 mph

PHF: _____

VOLUME ADJUSTMENTS

Movement No.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	0	545	140	210	425	0	10	0	5	65	10	105
Vol. (pcph), see Table 10-1	0			231			11	0	6	72	11	116

VOLUMES IN PCPH



#3 E. Brookline St./ Albany St.

WORKSHEET FOR FOUR-LEG INTERSECTIONS 1-hr AM

Page -

STEP 1: RT From Minor Street	V_9	V_{12}
Conflicting Flows, V_c	$1/2\ V_3 + V_2 = V_{c9}$ 70 + 545 = 615 vph	$1/2\ V_6 + V_5 = V_{c12}$ 0 + 425 = 425 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p9} = 615 pcph	c_{p12} = 765 pcph
Percent of c_p Utilized	$(v_9/c_{p9}) \times 100$ = 1.0 %	$(v_{12}/c_{p12}) \times 100$ = 15.2 %
Impedance Factor, P (Fig. 10-5)	P_9 = 0.99	P_{12} = 0.89
Actual Capacity, c_m	$c_{m9} = c_{p9}$ = 615 pcph	$c_{m12} = c_{p12}$ = 765 pcph

STEP 2: LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3 + V_2 = V_{c4}$ 140 + 545 = 685 vph	$V_6 - V_5 = V_{c1}$ 0 + 425 = 425 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p4} = 570 pcph	c_{p1} = 760 pcph
Percent of c_p Utilized	$(v_4/c_{p4}) \times 100$ = 40.5 %	$(v_1/c_{p1}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_4 = 0.66	P_1 = 1.0
Actual Capacity, c_m	$c_{m4} = c_{p4}$ = _____ pcph	$c_{m1} = c_{p1}$ = 760 pcph

STEP 3: TH From Minor Street	V_8	V_{11}
Conflicting Flows, V_c	$1/2V_3 + V_2 + V_1 + V_6 + V_5 + V_4 = V_{c8}$ 70 + 545 + 0 + 0 + 425 + 210 = 1250 vph	$1/2V_6 + V_5 + V_4 + V_3 + V_2 + V_1 = V_{c11}$ 0 + 425 + 210 + 140 + 545 + 0 = 1320 vph
Critical Gap, T_c (Tab. 10-2)	6.0 (sec)	6.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p8} = 180 pcph	c_{p11} = 170 pcph
Percent of c_p Utilized	$(v_8/c_{p8}) \times 100$ = 0 %	$(v_{11}/c_{p11}) \times 100$ = 6.5 %
Impedance Factor, P (Fig. 10-5)	P_8 = 1.0	P_{11} = 0.96
Actual Capacity, c_m	$c_{m8} = c_{p8} \times P_1 \times P_4$ 119 = 180 × 1.0 × 0.66 (pcph)	$c_{m11} = c_{p11} \times P_1 \times P_4$ 112 = 170 × 1.0 × 0.66 (pcph)

STEP 4: LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_{c8} (step 3) $- V_{11} - V_{12} = V_{c7}$ 1250 − 10 − 105 = 1365 vph	V_{c11} (step 3) $- V_9 - V_8 = V_{c10}$ 1320 − 0 − 5 = 1325 vph
Critical Gap, T_c (Tab. 10-2)	6.5 (sec)	6.5 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p7} = ~~180~~ 130 pcph	c_{p10} = 140 pcph
Actual Capacity, c_m	$c_{m7} = c_{p7} \times P_1 \times P_4 \times P_{11} \times P_{12}$ 73 = 130 × 1.0 × 0.66 × 0.96 × 0.89 pcph)	$c_{m10} = c_{p10} \times P_1 \times P_1 \times P_8 \times P_9$ 91 = 140 × 0.66 × 1.0 × 1.0 × 0.99 (pcph)

#3 E. Brookline St./ Albany Street

WORKSHEET FOR FOUR-LEG INTERSECTIONS

SHARED-LANE CAPACITY

2000 No-Build
1-hour
AM

$$c_{SH} = \frac{v_i + v_j}{(v_i/c_{mi}) + (v_j/c_{mj})}$$ where 2 movements share a lane

$$c_{SH} = \frac{v_i + v_j + v_k}{(v_i/c_{mi}) + (v_j/c_{mj}) + (v_k/c_{mk})}$$ where 3 movements share a lane

MINOR STREET APPROACH MOVEMENTS 7, 3, 9 Parking lot

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
7	11	73	106		
8	0	119			
9	6	615			

MINOR STREET APPROACH MOVEMENTS 10, 11, 12 E. Brookline St.

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
10	72	91	93		
11	11	112			
12					

MAJOR STREET LEFT TURNS 1, 4

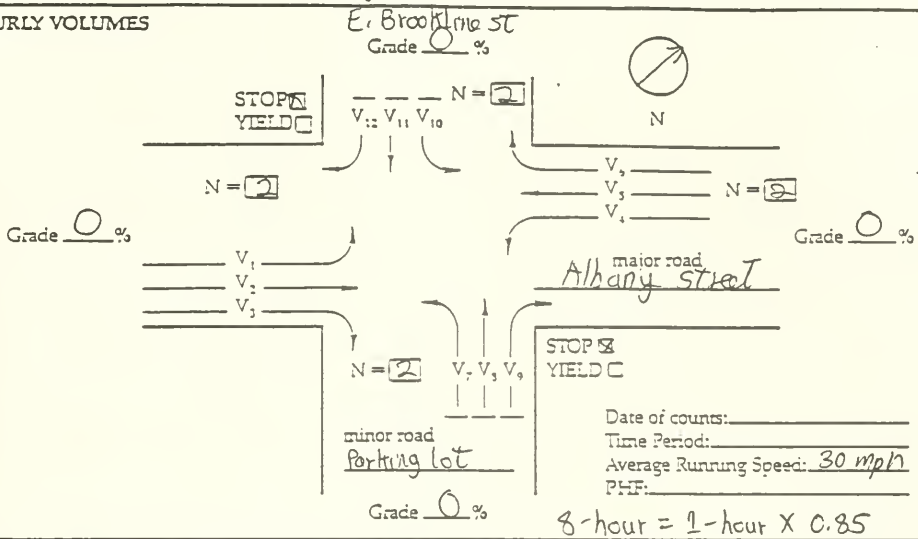
Movement	v (pcph)	c_m (pcph)	$c_R = c_m - v$	LOS
1				
4				

COMMENTS:

#3 WORKSHEET FOR FOUR-LEG INTERSECTIONS

Location: E. Brookline St. / Albany St. Name: 2000 No-Build 8-HR AM

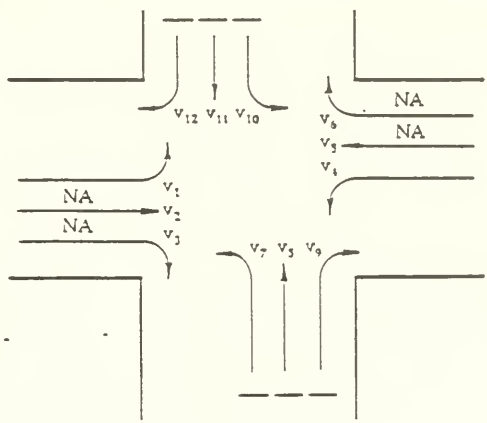
HOURLY VOLUMES



VOLUME ADJUSTMENTS

Movement No.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	0	463	119	179	361	0	9	0	5	55	9	89
Vol. (pcph), see Table 10-1	0			196			10	0	6	61	10	98

VOLUMES IN PCPH



E. Brookline St, Albany St

WORKSHEET FOR FOUR-LEG INTERSECTIONS

2010

Page _

STEP 1: RT From Minor Street	V_9	V_{12} 8-HR AM
Conflicting Flows, V_c	$1/2\,V_3 + V_2 = V_{c9}$ 60 + 463 = 523 vph	$1/2\,V_6 + V_5 = V_{c12}$ 0 + 361 = 361 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p9} = 675 pcph	c_{p12} = 825 pcph
Percent of c_p Utilized	$(v_9/c_{p9}) \times 100$ = 0.9 %	$(v_{12}/c_{p12}) \times 100$ = 11.9 %
Impedance Factor, P (Fig. 10-5)	P_9 = 0.99	P_{12} = 0.92
Actual Capacity, c_m	$c_{m9} = c_{p9}$ = 675 pcph	$c_{m12} = c_{p12}$ = 825 pcph

STEP 2: LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3 + V_2 = V_{c4}$ 119 + 463 = 582 vph	$V_6 + V_5 = V_{c1}$ 0 + 361 = 361 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p4} = 635 pcph	c_{p1} = 825 pcph
Percent of c_p Utilized	$(v_4/c_{p4}) \times 100$ = 30.9 %	$(v_1/c_{p1}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_4 = 0.755	P_1 = 1.0
Actual Capacity, c_m	$c_{m4} = c_{p4}$ = _____ pcph	$c_{m1} = c_{p1}$ = 825 pcph

STEP 3: TH From Minor Street	V_8	V_{11}
Conflicting Flows, V_c	$1/2V_3 + V_2 + V_1 + V_6 + V_5 + V_4 = V_{c8}$ 60 + 463 + 0 + 0 + 361 + 179 = 1063 vph	$1/2V_6 + V_5 + V_4 + V_3 + V_2 + V_1 = V_{c11}$ 0 + 361 + 179 + 119 + 463 + 0 = 1122 vph
Critical Gap, T_c (Tab. 10-2)	6.0 (sec)	6.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p8} = 245 pcph	c_{p11} = 220 pcph
Percent of c_p Utilized	$(v_8/c_{p8}) \times 100$ = 0 %	$(v_{11}/c_{p11}) \times 100$ = 4.5 %
Impedance Factor, P (Fig. 10-5)	P_8 = 1.0	P_{11} = 0.97
Actual Capacity, c_m	$c_{m8} = c_{p8} \times P_1 \times P_4$ 185 = 245 × 1.0 × 0.755 (pcph)	$c_{m11} = c_{p11} \times P_1 \times P_4$ 166 = 220 × 1.0 × 0.755 (pcph)

STEP 4: LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_{c8} (step 3) − V_{11} − V_{12} = V_{c7} 1063 − 9 − 89 = 1161 vph	V_{c11} (step 3) − V_7 − V_8 = V_{c10} 1122 − 0 − 5 = 1117 vph
Critical Gap, T_c (Tab. 10-2)	6.5 (sec)	6.5 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p7} = 175 pcph	c_{p10} = 180 pcph
Actual Capacity, c_m	$c_{m7} = c_{p7} \times P_1 \times P_4 \times P_{11} \times P_{12}$ 118 = 175 × 1.0 × 0.755 × 0.97 × 0.92 (pcph)	$c_{m10} = c_{p10} \times P_1 \times P_4 \times P_9$ 135 = 180 × 0.755 × 1.0 × 1.0 × 0.99 (pcph)

#3 E. Brookline St. WORKSHEET FOR FOUR-LEG INTERSECTIONS

& Albany St.

SHARED-LANE CAPACITY

2000 No-Build
8-hour am

$$c_{SH} = \frac{v_i + v_j}{(v_i/c_{mi}) + (v_j/c_{mj})}$$ where 2 movements share a lane

$$c_{SH} = \frac{v_i + v_j + v_k}{(v_i/c_{mi}) + (v_j/c_{mj}) + (v_k/c_{mk})}$$ where 3 movements share a lane

MINOR STREET APPROACH MOVEMENTS 7, 8, 9 Parking lot

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
7	10	118	171		
8	0	185			
9	6	675			

MINOR STREET APPROACH MOVEMENTS 10, 11, 12

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
10	61	135	139		
11	10	166			
12					

MAJOR STREET LEFT TURNS 1, 4

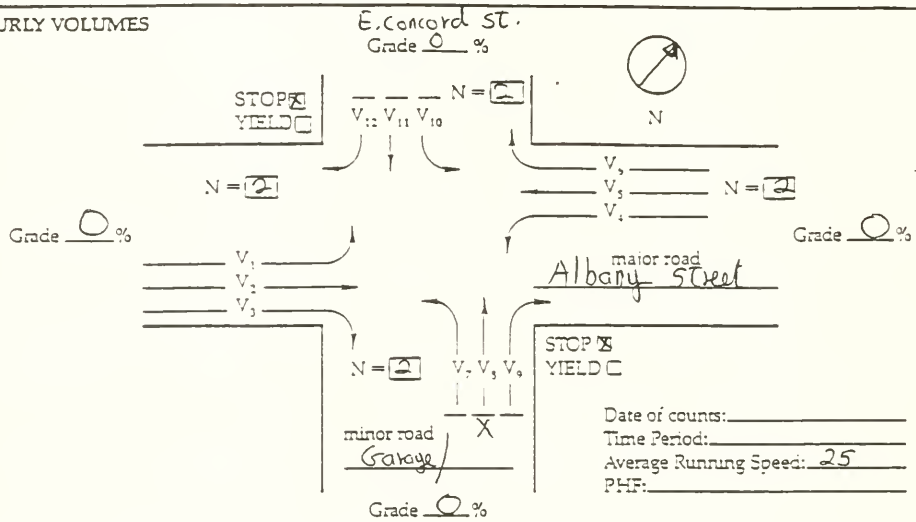
Movement	v (pcph)	c_m (pcph)	$c_R = c_m - v$	LOS
1				
4				

COMMENTS:

#5 WORKSHEET FOR FOUR-LEG INTERSECTIONS

Location: E. Concord st./Albany St. Name: 2000 Build AM 1-HR

HOURLY VOLUMES

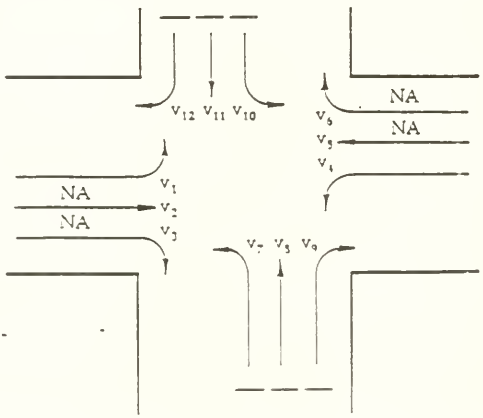


Date of counts:
Time Period:
Average Running Speed: 25
PHF:

VOLUME ADJUSTMENTS

Movement No.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	0	940	300	0	235	0	25	0	0	55	15	60
Vol. (pcph), see Table 10-1	0			0			28	0	0	61	17	66

VOLUMES IN PCPH



#5 E. Concord St./ Albany St.

WORKSHEET FOR FOUR-LEG INTERSECTIONS

Build - AM

STEP 1: RT From Minor Street	V_9	V_{12}
Conflicting Flows, V_c	$1/2\ V_3 + V_2 = V_{c9}$ 150 + 940 = 1090 vph	$1/2\ V_6 + V_5 = V_{c12}$ 0 + 235 = 235 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p9} = 350 pcph	c_{p12} = 950 pcph
Percent of c_p Utilized	$(v_9/c_{p9}) \times 100$ = 0 %	$(v_{12}/c_{p12}) \times 100$ = 6.9 %
Impedance Factor, P (Fig. 10-5)	P_9 = 1.0	P_{12} = 0.95
Actual Capacity, c_m	$c_{m9} = c_{p9}$ = 350 pcph	$c_{m12} = c_{p12}$ = 950 pcph

STEP 2: LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3 + V_2 = V_{c4}$ 300 + 940 = 1240 vph	$V_6 + V_5 = V_{c1}$ 0 + 235 = 235 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p4} = 280 pcph	c_{p1} = 950 pcph
Percent of c_p Utilized	$(v_4/c_{p4}) \times 100$ = 0 %	$(v_1/c_{p1}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_4 = 1.0	P_1 = 1.0
Actual Capacity, c_m	$c_{m4} = c_{p4}$ = _____ pcph	$c_{m1} = c_{p1}$ = 950 pcph

STEP 3: TH From Minor Street	V_8	V_{11}
Conflicting Flows, V_c	$1/2V_3+V_2+V_1+V_6+V_5+V_4=V_{c8}$ 150 + 940 + 0 + 0 + 235 + 0 = 1325 vph	$1/2V_6+V_5+V_4+V_3+V_2+V_1=V_{c11}$ 0 + 235 + 0 + 300 + 940 + 0 = 1475 vph
Critical Gap, T_c (Tab. 10-2)	6.0 (sec)	6.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p8} = 170 pcph	c_{p11} = 140 pcph
Percent of c_p Utilized	$(v_8/c_{p8}) \times 100$ = 0 %	$(v_{11}/c_{p11}) \times 100$ = 12.1 %
Impedance Factor, P (Fig. 10-5)	P_8 = 1.0	P_{11} = 0.92
Actual Capacity, c_m	$c_{m8} = c_{p8} \times P_1 \times P_4$ _____ = _____ × _____ × _____ (pcph)	$c_{m11} = c_{p11} \times P_1 \times P_4$ 140 = 140 × 1.0 × 1.0 (pcph)

STEP 4: LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_{c8} (step 3) $- V_{11} - V_{12} = V_{c7}$ 1325 − 15 − 60 = 1400 vph	V_{c11} (step 3) $+ V_8 - V_9 = V_{c10}$ 1475 − 0 − 0 = 1475 vph
Critical Gap, T_c (Tab. 10-2)	6.5 (sec)	6.5 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p7} = 125 pcph	c_{p10} = 115 pcph
Actual Capacity, c_m	$c_{m7} = c_{p7} \times P_1 \times P_4 \times P_{11} \times P_{12}$ 109 = 125 × 1.0 × 1.0 × 0.92 × 0.95 pcph)	$c_{m10} = c_{p10} \times P_4 \times P_1 \times P_8 \times P_9$ 115 = 115 × 1.0 × 1.0 × 1.0 × 1.0 (pcph)

E. Concord St. & Albany St.

WORKSHEET FOR FOUR-LEG INTERSECTIONS

Build A/M

SHARED-LANE CAPACITY

1-hour

$$c_{SH} = \frac{v_i + v_j}{(v_i/c_{mi}) + (v_j/c_{mj})}$$ where 2 movements share a lane

$$c_{SH} = \frac{v_i + v_j + v_k}{(v_i/c_{mi}) + (v_j/c_{mj}) + (v_k/c_{mk})}$$ where 3 movements share a lane

MINOR STREET APPROACH MOVEMENTS 7, 8, 9

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
7					
8					
9					

MINOR STREET APPROACH MOVEMENTS 10, 11, 12 E. Concord street

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
10	61	115	119		
11	17	140			
12					

MAJOR STREET LEFT TURNS 1, 4

Movement	v (pcph)	c_m (pcph)	$c_R = c_m - v$	LOS
1				
4				

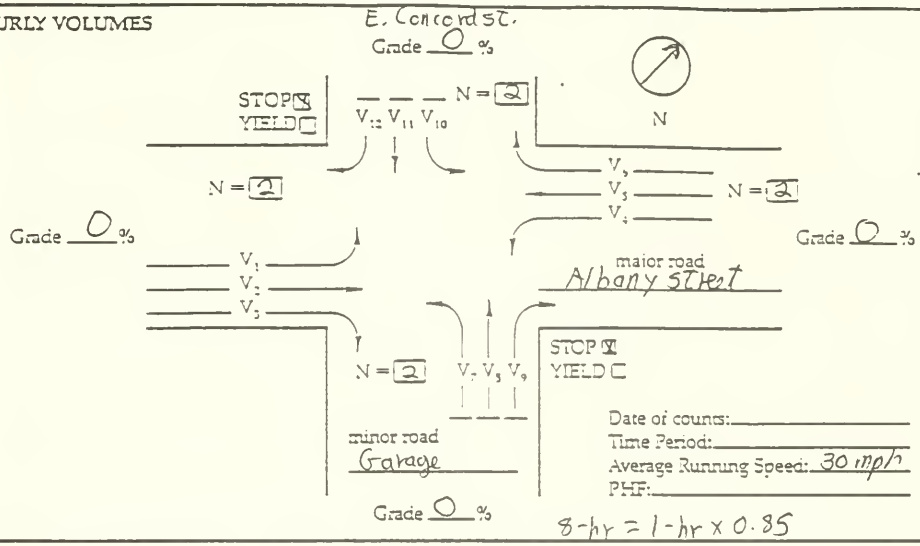
COMMENTS:

#5

WORKSHEET FOR FOUR-LEG INTERSECTIONS

Location: E. Concord St./Albany St. Name: 2000 Build 8-HR AM

HOURLY VOLUMES



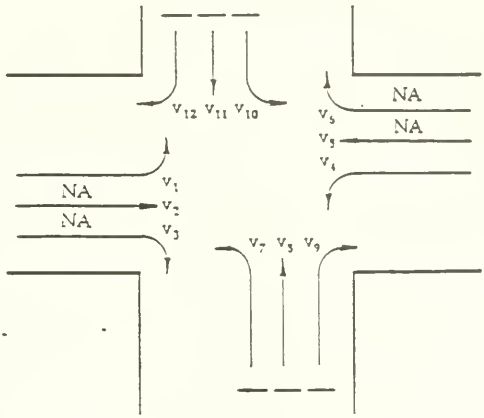
Date of counts:
Time Period:
Average Running Speed: 30 mph
PHF:

8-hr = 1-hr x 0.85

VOLUME ADJUSTMENTS

Movement No.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	0	799	255	0	200	0	21	0	0	47	13	51
Vol. (pcph), see Table 10-1				0			24	0	0	52	15	56

VOLUMES IN PCPH



Albany St. #3 WORKSHEET FOR [illegible]

STEP 1: RT From Minor Street	V_9	V_{12} TM
Conflicting Flows, V_c	$1/2\ V_3 + V_2 = V_{c9}$ 128 + 799 = 927 vph	$1/2\ V_6 + V_5 = V_{c12}$ 0 + 200 = 200 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p9} = 425 pcph	c_{p12} = 980 pcph
Percent of c_p Utilized	$(v_9/c_{p9}) \times 100$ = 0 %	$(v_{12}/c_{p12}) \times 100$ = 5.7 %
Impedance Factor, P (Fig. 10-5)	P_9 = 1.0	P_{12} = 0.96
Actual Capacity, c_m	$c_{m9} = c_{p9}$ = 425 pcph	$c_{m12} = c_{p12}$ = 980 pcph
STEP 2: LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3 + V_2 = V_{c4}$ 255 + 799 = 1054 vph	$V_6 + V_5 = V_{c1}$ 0 + 200 = 200 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p4} = 370 pcph	c_{p1} = 980 pcph
Percent of c_p Utilized	$(v_4/c_{p4}) \times 100$ = 0 %	$(v_1/c_{p1}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_4 = 1.0	P_1 = 1.0
Actual Capacity, c_m	$c_{m4} = c_{p4}$ = 370 pcph	$c_{m1} = c_{p1}$ = 980 pcph
STEP 3: TH From Minor Street	V_5	V_{11}
Conflicting Flows, V_c	$1/2V_3+V_2+V_1+V_6+V_5+V_4=V_{c8}$ 128 + 799 + 0 + 0 + 200 + 0 = 1127 vph	$1/2V_6+V_5+V_4+V_3+V_2+V_1=V_{c11}$ 0 + 200 + 0 + 255 + 799 + 0 = 1254 vph
Critical Gap, T_c (Tab. 10-2)	6.0 (sec)	6.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p8} = 220 pcph	c_{p11} = 180 pcph
Percent of c_p Utilized	$(v_5/c_{p8}) \times 100$ = 0 %	$(v_{11}/c_{p11}) \times 100$ = 1.2 %
Impedance Factor, P (Fig. 10-5)	P_8 = 1.0	P_{11} = 0.99
Actual Capacity, c_m	$c_{m8} = c_{p8} \times P_1 \times P_4$ 220 = 220 × 1.0 × 1.0 (pcph)	$c_{m11} = c_{p11} \times P_1 \times P_4$ 180 = 180 × 1.0 × 1.0 (pcph)
STEP 4: LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_{c8} (step 3) $+ V_{11} + V_{12} = V_{c7}$ 1127 + 13 + 51 = 1191 vph	V_{c11} (step 3) $+ V_8 + V_9 = V_{c10}$ 1254 + 0 + 0 = 1254 vph
Critical Gap, T_c (Tab. 10-2)	6.5 (sec)	6.5 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p7} = 165 pcph	c_{p10} = 150 pcph
Actual Capacity, c_m	$c_{m7} = c_{p7} \times P_1 \times P_4 \times P_{11} \times P_{12}$ 157 = 165 × 1.0 × 1.0 × 0.99 × 0.96 (pcph)	$c_{m10} = c_{p10} \times P_4 \times P_1 \times P_8 \times P_9$ 150 = 150 × 1.0 × 1.0 × 1.0 × 1.0 (pcph)

E. Concord St. / Albany St.

WORKSHEET FOR FOUR-LEG INTERSECTIONS

SHARED-LANE CAPACITY

2000 Build
8-hour
am

$$c_{SH} = \frac{v_i + v_j}{(v_i/c_{mi}) + (v_j/c_{mj})}$$ where 2 movements share a lane

$$c_{SH} = \frac{v_i + v_j + v_k}{(v_i/c_{mi}) + (v_j/c_{mj}) + (v_k/c_{mk})}$$ where 3 movements share a lane

MINOR STREET APPROACH MOVEMENTS 7, 8, 9

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
7					
8					
9					

MINOR STREET APPROACH MOVEMENTS 10, 11, 12 E. Concord St.

Movement	v(pcph)	c_m(pcph)	c_{SH}(pcph)	$c_R = c_{SH} - v$	LOS
10	52	150	156		
11	15	180			
12					

MAJOR STREET LEFT TURNS 1, 4

Movement	v (pcph)	c_m (pcph)	$c_R = c_m - v$	LOS
1				
4				

COMMENTS:

#5

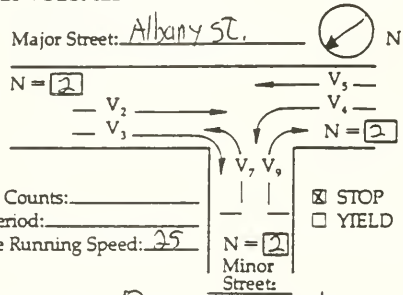
WORKSHEET FOR ANALYSIS OF T-INTERSECTIONS

LOCATION: E. Concord St. / Albany St.

NAME: 2000 No-Build 1-HR

HOURLY VOLUMES

Major Street: Albany St.



Date of Counts: _____

Time Period: _____

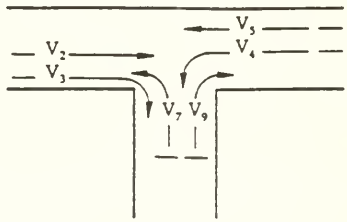
Average Running Speed: 25

☒ STOP
☐ YIELD

PHF: _____ Grade 0 %

VOLUMES IN PCPH

AM



VOLUME ADJUSTMENTS

Movement No.	2	3	4	5	7	9
Volume (vph)	290	0	0	860	55	60
Vol. (pcph), see Table 10-1			0		61	66

STEP 1: RT from Minor Street — V_9

Conflicting Flow, V_c: $1/2\ V_3 + V_2 =$ 0 + 290 = 290 vph (V_{c9})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p9} =$ 900 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m9} = c_{p9} =$ 900 pcph

STEP 2: LT From Major Street — V_4

Conflicting Flow, V_c: $V_3 + V_2 =$ 0 + 290 = 290 vph (V_{c4})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p4} =$ 900 pcph (Fig. 10-3)

Percent of c_p Utilized and Impedance Factor (Fig. 10-5): $(v_4/c_{p4}) \times 100 =$ 0 $P_4 =$ 1.0

Actual Capacity, c_m: $c_{m4} = c_{p4} =$ 900 pcph

STEP 3: LT From Minor Street — V_7

Conflicting Flow, V_c: $1/2\ V_3+V_2+V_5+V_4 =$ 0 + 290 + 860 + 0 = 1150 vph (V_{c7})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 6.5 sec (Table 10-2) $c_{p7} =$ 175 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m7} = c_{p7} \times P_4 =$ 175 × 1.0 = 175 pcph

SHARED-LANE CAPACITY

$$SH = \frac{v_7 + v_9}{(v_7/c_{m7}) + (v_9/c_{m9})} \text{ if lane is shared}$$

Movement No.	v(pcph)	c_m (pcph)	c_{SH} (pcph)	c_R	LOS
7					
9					
4					

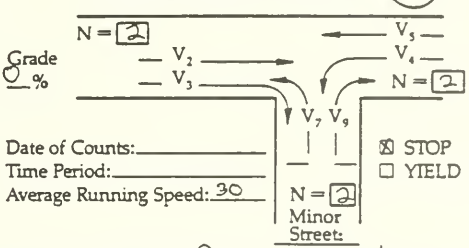
#5

WORKSHEET FOR ANALYSIS OF T-INTERSECTIONS

LOCATION: E. Concord St./Albany St. NAME: 2000 No-Build 8-HR AM

HOURLY VOLUMES

Major Street: Albany Street N



Date of Counts: _____

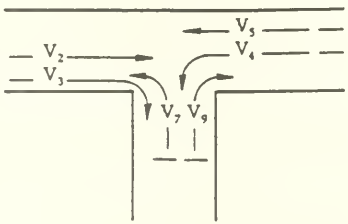
Time Period: _____

Average Running Speed: 30

☒ STOP
☐ YIELD

PHF: _____ Grade 0 %

VOLUMES IN PCPH



8-hour = 1-hour X 0.85

VOLUME ADJUSTMENTS

Movement No.	2	3	4	5	7	9
Volume (vph)	247	0	0	731	47	51
Vol. (pcph), see Table 10-1			0		52	56

STEP 1: RT from Minor Street — V_9

Conflicting Flow, V_c: $1/2\ V_3 + V_2 =$ 0 + 247 = 247 vph (V_{c9})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p9} =$ 925 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m9} = c_{p9} =$ 925 pcph

STEP 2: LT From Major Street — V_4

Conflicting Flow, V_c: $V_3 + V_2 =$ 0 + 247 = 247 vph (V_{c4})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p4} =$ 925 pcph (Fig. 10-3)

Percent of c_p Utilized and Impedance Factor (Fig. 10-5): $(v_4/c_{p4}) \times 100 =$ 0 $P_4 =$ 1.0

Actual Capacity, c_m: $c_{m4} = c_{p4} =$ 925 pcph

STEP 3: LT From Minor Street — V_7

Conflicting Flow, V_c: $1/2\ V_3+V_2+V_5+V_4 =$ 0 + 247 + 731 + 0 = 978 vph (V_{c7})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 6.5 sec (Table 10-2) $c_{p7} =$ 230 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m7} = c_{p7} \times P_4 =$ 230 X 1.0 = 230 pcph

SHARED-LANE CAPACITY

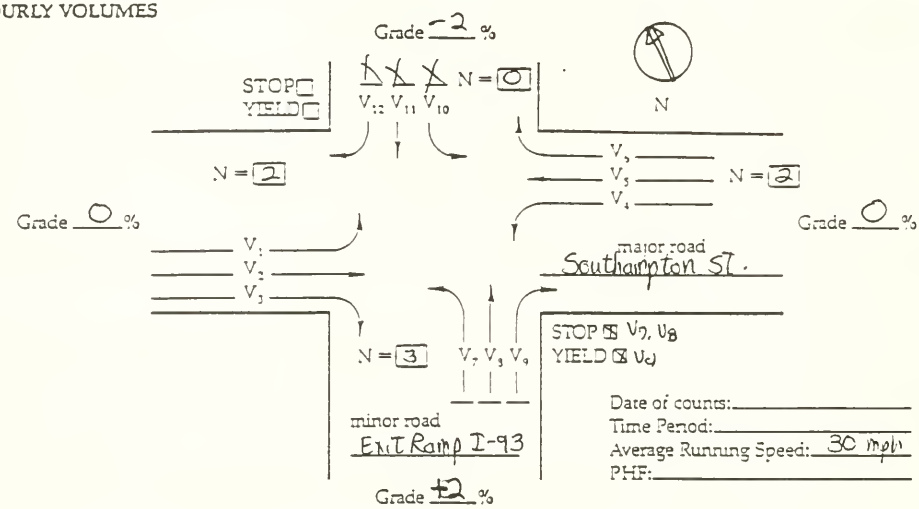
$$SH = \frac{v_7 + v_9}{(v_7/c_{m7}) + (v_9/c_{m9})} \text{ if lane is shared}$$

Movement No.	v(pcph)	c_m (pcph)	c_{SH} (pcph)	c_R	LOS
7					
9					
4					

#12 WORKSHEET FOR FOUR-LEG INTERSECTIONS

Location: Southampton St. / Frontage Rd Name: 2000 Build 1-HR AM

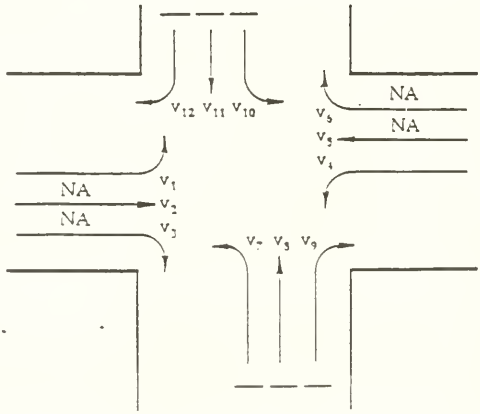
HOURLY VOLUMES



VOLUME ADJUSTMENTS

Movement No.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	340	250	—	—	555	305	210	60	85	—	—	—
Vol. (pcph), see Table 10-1	374			—			294	84	119	—	—	—

VOLUMES IN PCPH



#12

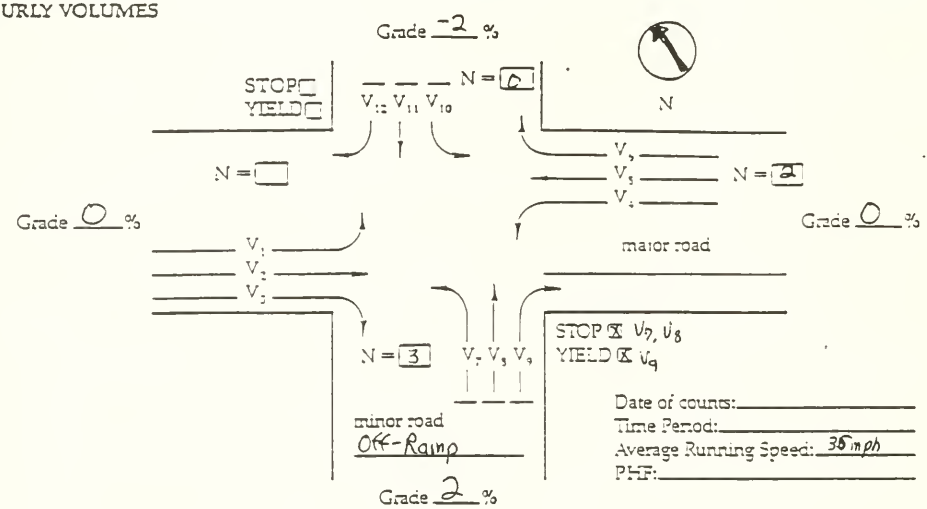
Southampton St. / Frontage Rd — WORKSHEET FOR FOUR-LEG INTERSECTIONS — 2000 Build 1-HR AM — Page 2

STEP 1: RT From Minor Street	V_9	V_{12}
Conflicting Flows, V_c	$1/2\,V_3 + V_2 = V_{c9}$ 0 + 250 = 250 vph	$1/2\,V_6 + V_5 = V_{c12}$ ___ + ___ = ___ vph
Critical Gap, T_c (Tab. 10-2)	4.5 (sec)	___ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p9} = 1050 pcph	c_{p12} = ___ pcph
Percent of c_p Utilized	$(v_9/c_{p9}) \times 100$ = 11.3 %	$(v_{12}/c_{p12}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_9 = 0.92	P_{12} = 1.0
Actual Capacity, c_m	$c_{m9} = c_{p9}$ = 1050 pcph	$c_{m12} = c_{p12}$ = ___ pcph
STEP 2: LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3 + V_2 = V_{c4}$ 0 + 250 = 250 vph	$V_6 + V_5 = V_{c1}$ 305 + 555 = 860 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p4} = 925 pcph	c_{p1} = 465 pcph
Percent of c_p Utilized	$(v_4/c_{p4}) \times 100$ = 0 %	$(v_1/c_{p1}) \times 100$ = 80.4 %
Impedance Factor, P (Fig. 10-5)	P_4 = 1.0	P_1 = 0.25
Actual Capacity, c_m	$c_{m4} = c_{p4}$ = 925 pcph	$c_{m1} = c_{p1}$ = 465 pcph
STEP 3: TH From Minor Street	V_8	V_{11}
Conflicting Flows, V_c	$1/2V_3 + V_2 + V_1 + V_6 + V_5 + V_4 = V_{c8}$ 0 + 250 + 340 + 305 + 555 + 0 = 1450 vph	$1/2V_9 + V_5 + V_4 + V_3 + V_2 + V_1 = V_{c11}$ ___ + ___ + ___ + ___ + ___ + ___ = ___ vph
Critical Gap, T_c (Tab. 10-2)	6.0 (sec)	___ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p8} = 140 pcph	c_{p11} = ___ pcph
Percent of c_p Utilized	$(v_8/c_{p8}) \times 100$ = 60 %	$(v_{11}/c_{p11}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_8 = 0.48	P_{11} = 1.0
Actual Capacity, c_m	$c_{m8} = c_{p8} \times P_1 \times P_4$ 35 = 140 × .25 × 1.0 (pcph)	$c_{m11} = c_{p11} \times P_1 \times P_4$ ___ = ___ × ___ × ___ (pcph)
STEP 4: LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_{c8} (step 3) $- V_{11} - V_{12} = V_{c7}$ 1450 − 0 − 0 = 1450 vph	V_{c11} (step 3) $- V_8 - V_9 = V_{c10}$ ___ − ___ − ___ = ___ vph
Critical Gap, T_c (Tab. 10-2)	6.5 (sec)	___ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p7} = 115 pcph	c_{p10} = ___ pcph
Actual Capacity, c_m	$c_{m7} = c_{p7} \times P_1 \times P_4 \times P_{11} \times P_{12}$ 29 = 115 × .25 × 1.0 × 1.0 × 1.0 pcph	$c_{m10} = c_{p10} \times P_4 \times P_1 \times P_8 \times P_9$ ___ = ___ × ___ × ___ × ___ × ___ pcph

WORKSHEET FOR FOUR-LEG INTERSECTIONS

Location: Southampton St. / Frontage Rd Name: 2000 Build 8-HR AM

HOURLY VOLUMES

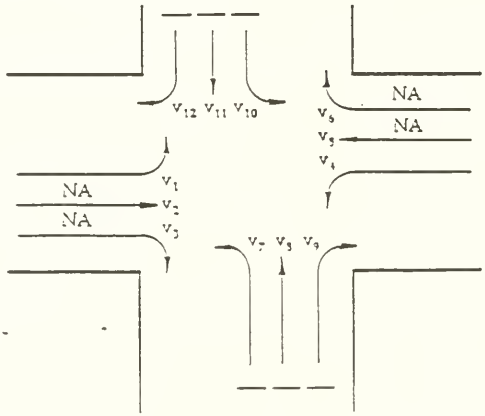


Date of counts:
Time Period:
Average Running Speed: 35 mph
PHF:

VOLUME ADJUSTMENTS

Movement No.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	289	213	–	–	472	259	179	51	72	–	–	–
Vol. (pcph), see Table 10-1	318			–			251	71	101	–	–	–

VOLUMES IN PCPH



#1a

Southampton St. / Frontage Rd

WORKSHEET FOR FOUR-LEG INTERSECTIONS

Build Am 8-hr

STEP 1: RT From Minor Street	V_9	V_{12}
Conflicting Flows, V_c	$1/2\ V_3 + V_2 = V_{c9}$ 0 + 213 = 213 vph	$1/2\ V_6 + V_5 = V_{c12}$ ___ + ___ = ___ vph
Critical Gap, T_c (Tab. 10-2)	4.5 (sec)	___ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p9} = 1100 pcph	c_{p12} = ___ pcph
Percent of c_p Utilized	$(v_9/c_{p9}) \times 100$ = 9.2 %	$(v_{12}/c_{p12}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_9 = 0.94	P_{12} = 1.0
Actual Capacity, c_m	$c_{m9} = c_{p9}$ = 1100 pcph	$c_{m12} = c_{p12}$ = ___ pcph

STEP 2: LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3 + V_2 = V_{c4}$ 0 + 213 = 213 vph	$V_6 + V_5 = V_{c1}$ 259 + 472 = 731 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p4} = 970 pcph	c_{p1} = 540 pcph
Percent of c_p Utilized	$(v_4/c_{p4}) \times 100$ = 0 %	$(v_1/c_{p1}) \times 100$ = 58.9 %
Impedance Factor, P (Fig. 10-5)	P_4 = 1.0	P_1 = 0.49
Actual Capacity, c_m	$c_{m4} = c_{p4}$ = ___ pcph	$c_{m1} = c_{p1}$ = 540 pcph

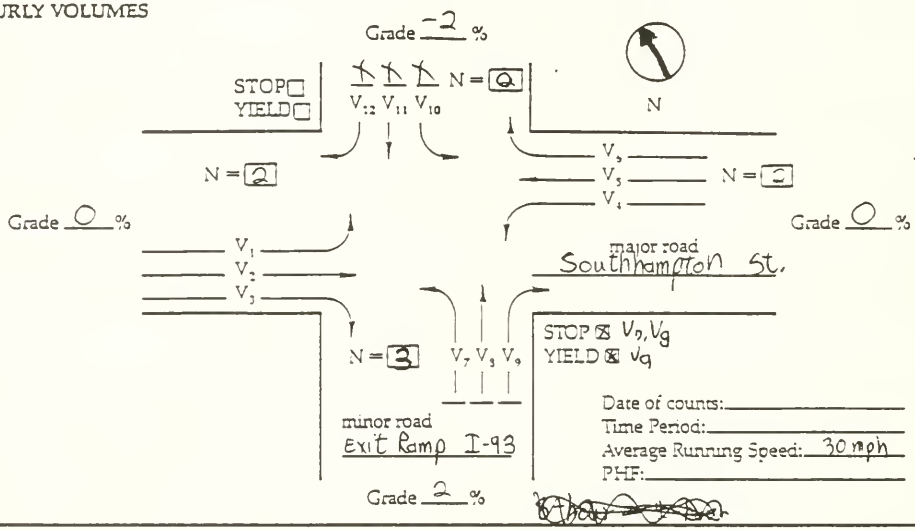
STEP 3: TH From Minor Street	V_8	V_{11}
Conflicting Flows, V_c	$1/2V_3+V_2+V_1+V_6+V_5+V_4=V_{c8}$ 0 + 213 + 284 + 259 + 472 + 0 = 1233 vph	$1/2V_6+V_5+V_4+V_3+V_2+V_1=V_{c11}$ ___ + ___ + ___ + ___ + ___ + ___ = ___ vph
Critical Gap, T_c (Tab. 10-2)	6.0 (sec)	___ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p8} = 185 pcph	c_{p11} = ___ pcph
Percent of c_p Utilized	$(v_8/c_{p8}) \times 100$ = 38.4 %	$(v_{11}/c_{p11}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_8 = 0.68	P_{11} = 1.0
Actual Capacity, c_m	$c_{m8} = c_{p8} \times P_1 \times P_4$ 91 = 185 × 0.49 × 1.0 (pcph)	$c_{m11} = c_{p11} \times P_1 \times P_4$ ___ = ___ × ___ × ___ (pcph)

STEP 4: LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_{c8} (step 3) $+ V_{11} + V_{12} = V_{c7}$ 1233 + 0 + 0 = 1233 vph	V_{c11} (step 3) $+ V_8 + V_9 = V_{c10}$ ___ + ___ + ___ = ___ vph
Critical Gap, T_c (Tab. 10-2)	6.5 (sec)	___ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p7} = 155 pcph	c_{p10} = ___ pcph
Actual Capacity, c_m	$c_{m7} = c_{p7} \times P_1 \times P_4 \times P_{11} \times P_{12}$ 76 = 155 × 0.49 × 1.0 × 1.0 × 1.0 (pcph)	$c_{m10} = c_{p10} \times P_4 \times P_1 \times P_8 \times P_9$ ___ = ___ × ___ × ___ × ___ × ___ (pcph)

#12 WORKSHEET FOR FOUR-LEG INTERSECTIONS

Location: Southhampton St. / Frontage Rd Name: 2000 No-Build AM 1-HR

HOURLY VOLUMES

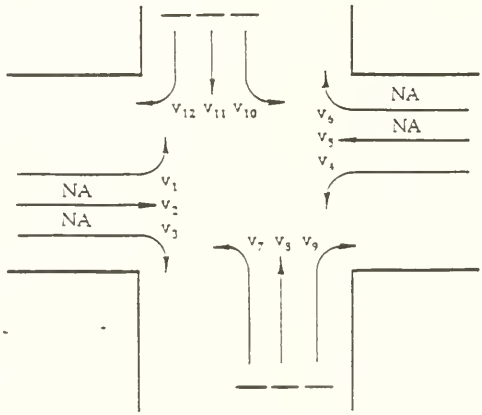


Date of counts:
Time Period:
Average Running Speed: 30 mph
PHF:

VOLUME ADJUSTMENTS

Movement No.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	340	250	—	—	550	305	190	60	85	—	—	—
Vol. (pcph), see Table 10-1	374			—			266	84	119	—	—	—

VOLUMES IN PCPH



#12 Southhampton St./ Frontage Rd WORKSHEET FOR FOUR-LEG INTERSECTIONS 2000 Dunia AM 1-HR Page 2

STEP 1: RT From Minor Street	V_9	V_{12}
Conflicting Flows, V_c	$1/2\ V_3 + V_2 = V_{c9}$ 0 + 250 = 250 vph	$1/2\ V_6 + V_5 = V_{c12}$ 153 + 550 = 703 vph
Critical Gap, T_c (Tab. 10-2)	4.5 (sec)	____ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p9} = 1050 pcph	c_{p12} = ____ pcph
Percent of c_p Utilized	$(v_9/c_{p9}) \times 100$ = 11.3 %	$(v_{12}/c_{p12}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_9 = 0.92	P_{12} = 1.0
Actual Capacity, c_m	$c_{m9} = c_{p9}$ = 1050 pcph	$c_{m12} = c_{p12}$ = ____ pcph

STEP 2: LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3 + V_2 = V_{c4}$ 0 + 250 = 250 vph	$V_6 + V_5 = V_{c1}$ 305 + 550 = 855 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p4} = 925 pcph	c_{p1} = 470 pcph
Percent of c_p Utilized	$(v_4/c_{p4}) \times 100$ = 0 %	$(v_1/c_{p1}) \times 100$ = 79.6 %
Impedance Factor, P (Fig. 10-5)	P_4 = 1.0	P_1 = 0.26
Actual Capacity, c_m	$c_{m4} = c_{p4}$ = 925 pcph	$c_{m1} = c_{p1}$ = 470 pcph

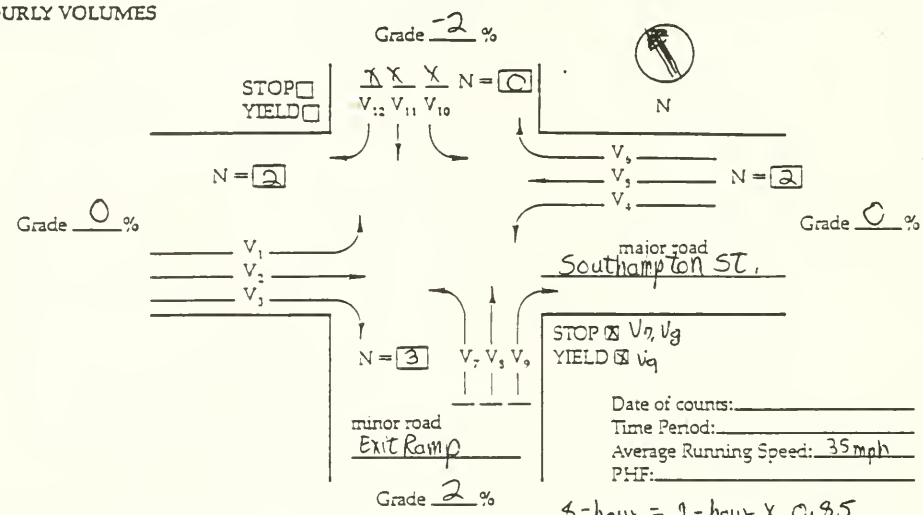
STEP 3: TH From Minor Street	V_8	V_{11}
Conflicting Flows, V_c	$1/2V_3 + V_2 + V_1 + V_9 + V_5 + V_4 = V_{c8}$ 0 + 250 + 340 + 305 + 550 + 0 = 1445 vph	$1/2V_6 + V_5 + V_4 + V_9 + V_2 + V_1 = V_{c11}$ ____ + ____ + ____ + ____ + ____ + ____ = ____ vph
Critical Gap, T_c (Tab. 10-2)	6.0 (sec)	____ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p8} = 145 pcph	c_{p11} = ____ pcph
Percent of c_p Utilized	$(v_8/c_{p8}) \times 100$ = 57.9 %	$(v_{11}/c_{p11}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_8 = 0.5	P_{11} = 1.0
Actual Capacity, c_m	$c_{m8} = c_{p8} \times P_1 \times P_4$ 38 = 145 × .26 × 1.0 (pcph)	$c_{m11} = c_{p11} \times P_1 \times P_4$ ____ = ____ × ____ × ____ (pcph)

STEP 4: LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_{c8} (step 3) $+ V_{11} - V_{12} = V_{c7}$ 1445 − 0 + 0 = 1445 vph	V_{c11} (step 3) $+ V_8 + V_9 = V_{c10}$ ____ + ____ + ____ = ____ vph
Critical Gap, T_c (Tab. 10-2)	6.5 (sec)	____ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p7} = 120 pcph	c_{p10} = ____ pcph
Actual Capacity, c_m	$c_{m7} = c_{p7} \times P_1 \times P_4 \times P_{11} \times P_{12}$ 31 = 120 × .26 × 1.0 × 1.0 × 1.0 (pcph)	$c_{m10} = c_{p10} \times P_4 \times P_1 \times P_8 \times P_9$ ____ = ____ × ____ × ____ × ____ × ____ (pcph)

#12 WORKSHEET FOR FOUR-LEG INTERSECTIONS

Location: Southampton St. / Frontage Rd Name: 2000 No-Build 8-HR AM

HOURLY VOLUMES



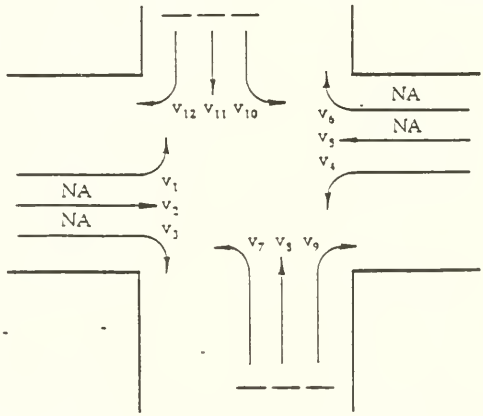
Date of counts:
Time Period:
Average Running Speed: 35 mph
PHF:

8-hour = 1-hour X 0.85

VOLUME ADJUSTMENTS

Movement No.	1	2	3	4	5	6	7	8	9	10	11	12
Volume (vph)	289	213	—	—	468	259	162	51	72	—	—	—
Vol. (pcph), see Table 10-1	318			—			226	71	101	—	—	—

VOLUMES IN PCPH



#12 Southampton St. Frontage Rd. WORKSHEET FOR FOUR-LEG INTERSECTIONS 8-HR AM

STEP 1: RT From Minor Street	V_9	V_{12}
Conflicting Flows, V_c	$1/2\ V_3 + V_2 = V_{c9}$ 0 + 213 = 213 vph	$1/2\ V_6 + V_5 = V_{c12}$ ___ + ___ = ___ vph
Critical Gap, T_c (Tab. 10-2)	4.5 (sec)	___ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p9} = 1100 pcph	c_{p12} = ___ pcph
Percent of c_p Utilized	$(v_9/c_{p9}) \times 100$ = 9.2 %	$(v_{12}/c_{p12}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_9 = 0.94	P_{12} = 1.0
Actual Capacity, c_m	$c_{m9} = c_{p9}$ = 1100 pcph	$c_{m12} = c_{p12}$ = ___ pcph

STEP 2: LT From Major Street	V_4	V_1
Conflicting Flows, V_c	$V_3 + V_2 = V_{c4}$ 0 + 213 = 213 vph	$V_6 + V_5 = V_{c1}$ 259 + 468 = 727 vph
Critical Gap, T_c (Tab. 10-2)	5.0 (sec)	5.0 (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p4} = 970 pcph	c_{p1} = 545 pcph
Percent of c_p Utilized	$(v_4/c_{p4}) \times 100$ = 0 %	$(v_1/c_{p1}) \times 100$ = 58.3 %
Impedance Factor, P (Fig. 10-5)	P_4 = 1.0	P_1 = 0.5
Actual Capacity, c_m	$c_{m4} = c_{p4}$ = 970 pcph	$c_{m1} = c_{p1}$ = 545 pcph

STEP 3: TH From Minor Street	V_5	V_{11}
Conflicting Flows, V_c	$1/2V_3+V_2+V_1+V_6+V_5+V_4=V_{c8}$ 0 + 213 + 289 + 259 + 468 + 0 = 1229 vph	$1/2V_6+V_5+V_4+V_3+V_2+V_1=V_{c11}$ ___ + ___ + ___ + ___ + ___ + ___ = ___ vph
Critical Gap, T_c (Tab. 10-2)	6.0 (sec)	___ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p8} = 190 pcph	c_{p11} = ___ pcph
Percent of c_p Utilized	$(v_5/c_{p8}) \times 100$ = 37.4 %	$(v_{11}/c_{p11}) \times 100$ = 0 %
Impedance Factor, P (Fig. 10-5)	P_8 = 0.70	P_{11} = 1.0
Actual Capacity, c_m	$c_{m8} = c_{p8} \times P_1 \times P_4$ 95 = 190 × 0.5 × 1.0 (pcph)	$c_{m11} = c_{p11} \times P_1 \times P_4$ ___ = ___ × ___ × ___ (pcph)

STEP 4: LT From Minor Street	V_7	V_{10}
Conflicting Flows, V_c	V_{c8} (step 3) $+ V_{11} + V_{12} = V_{c7}$ 1229 + 0 + 0 = 1229 vph	V_{c11} (step 3) $+ V_8 + V_9 = V_{c10}$ ___ + ___ + ___ = ___ vph
Critical Gap, T_c (Tab. 10-2)	6.5 (sec)	___ (sec)
Potential Capacity, c_p (Fig. 10-3)	c_{p7} = 160 pcph	c_{p10} = ___ pcph
Actual Capacity, c_m	$c_{m7} = c_{p7} \times P_1 \times P_4 \times P_{11} \times P_{12}$ 80 = 160 × 0.5 × 1.0 × 1.0 × 1.0 (pcph)	$c_{m10} = c_{p10} \times P_4 \times P_1 \times P_8 \times P_9$ ___ = ___ × ___ × ___ × ___ × ___ (pcph)

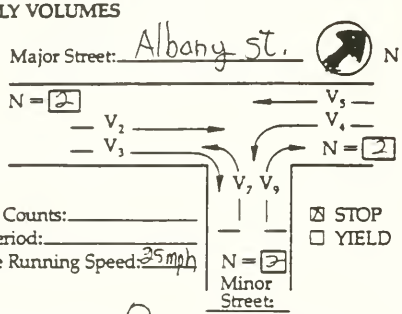
WORKSHEET FOR ANALYSIS OF T-INTERSECTIONS

LOCATION: Site Garage Exit / Albany St.

NAME: 2000 Build AM 2-hour

HOURLY VOLUMES

Major Street: Albany St.



Date of Counts: _____

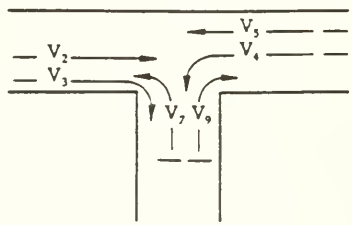
Time Period: _____

Average Running Speed: 35 mph

☒ STOP
☐ YIELD

PHF: _____ Grade 0 %

VOLUMES IN PCPH



VOLUME ADJUSTMENTS

Movement No.	2	3	4	5	7	9
Volume (vph)	985	10	205	230	20	5
Vol. (pcph), see Table 10-1			226		22	6

STEP 1: RT from Minor Street — V_9

Conflicting Flow, V_c: $1/2\ V_3 + V_2 =$ 5 + 985 = 990 vph (V_{c9})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p9} =$ 395 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m9} = c_{p9} =$ 395 pcph

STEP 2: LT From Major Street — V_4

Conflicting Flow, V_c: $V_3 + V_2 =$ 10 + 985 = 995 vph (V_{c4})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p4} =$ 390 pcph (Fig. 10-3)

Percent of c_p Utilized and Impedance Factor (Fig. 10-5): $(v_4/c_{p4}) \times 100 =$ 52.9% $P_4 =$ 0.5

Actual Capacity, c_m: $c_{m4} = c_{p4} =$ 390 pcph

STEP 3: LT From Minor Street — V_7

Conflicting Flow, V_c: $1/2\ V_3 + V_2 + V_5 + V_4 =$ 5 + 985 + 230 + 205 = 1425 vph (V_{c7})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 6.5 sec (Table 10-2) $c_{p7} =$ 125 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m7} = c_{p7} \times P_4 =$ 125 × 0.5 = 63 pcph

SHARED-LANE CAPACITY

$$SH = \frac{v_7 + v_9}{(v_7/c_{m7}) + (v_9/c_{m9})} \text{ if lane is shared}$$

Movement No.	v(pcph)	c_m (pcph)	c_{SH} (pcph)	c_R	LOS
7					
9					
4					

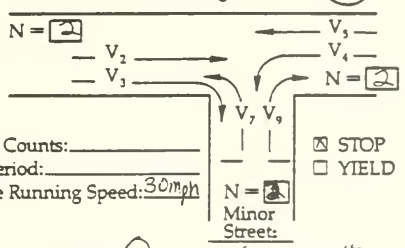
WORKSHEET FOR ANALYSIS OF T-INTERSECTIONS

LOCATION: Site Garage Exit/Albany St.

NAME: 2000 Build 8-hr am

HOURLY VOLUMES

Major Street: Albany St.



Date of Counts: _____

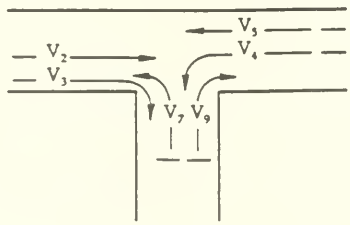
Time Period: _____

Average Running Speed: 30mph

☒ STOP
☐ YIELD

PHF: _____ Grade 0 %

VOLUMES IN PCPH



8-hour = 1-hour X 0.85

VOLUME ADJUSTMENTS

Movement No.	2	3	4	5	7	9
Volume (vph)	837	9	174	196	17	5
Vol. (pcph), see Table 10-1			192		19	6

STEP 1: RT from Minor Street — V_9

Conflicting Flow, V_c: $1/2\ V_3 + V_2 =$ 5 + 837 = 842 vph (V_{c9})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p9} =$ 465 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m9} = c_{p9} =$ 465 pcph

STEP 2: LT From Major Street — V_4

Conflicting Flow, V_c: $V_3 + V_2 =$ 9 + 837 = 846 vph (V_{c4})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 5.0 sec (Table 10-2) $c_{p4} =$ 465 pcph (Fig. 10-3)

Percent of c_p Utilized and Impedance Factor (Fig. 10-5): $(v_4/c_{p4}) \times 100 =$ 41.3% $P_4 =$ 0.66

Actual Capacity, c_m: $c_{m4} = c_{p4} =$ 465 pcph

STEP 3: LT From Minor Street — V_7

Conflicting Flow, V_c: $1/2\ V_3+V_2+V_5+V_4 =$ 5 + 837 + 196 + 174 = 1212 vph (V_{c7})

Critical Gap, T_c, and Potential Capacity, c_p: $T_c =$ 6.5 sec (Table 10-2) $c_{p7} =$ 165 pcph (Fig. 10-3)

Actual Capacity, c_m: $c_{m7} = c_{p7} \times P_4 =$ 165 × 0.66 = 109 pcph

SHARED-LANE CAPACITY

$$SH = \frac{v_7 + v_9}{(v_7/c_{m7}) + (v_9/c_{m9})} \text{ if lane is shared}$$

Movement No.	v(pcph)	c_m (pcph)	c_{SH} (pcph)	c_R	LOS
7					
9					
4					

APPENDIX E

CORRESPONDENCE WITH DEP AND BRA

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection

Daniel S. Greenbaum
Commissioner

April 29, 1991

Mr. Robert J. Rossi
Tech Environmental, Inc.
Reservoir Place
1601 Trapelo Road
Waltham, MA 02154

Re: University Associates Development
Albany Street

Dear Mr. Rossi:

Thank you for sending me the air quality modeling protocol from your April 23 meeting with Richard Mertens for the University Associates - Albany Street project.

I concur with the intersections chosen for analysis and the inputs to the CAL3QHC and MOBILE 4 models.

Sincerely,

Christine Kirby
Regional Planner

CK:dep

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April 25, 1991

Mr. Robert J. Rossi
Tech Environmental, Inc.
Reservoir Place
1601 Trapelo Road
Waltham, MA 02154

RE: UNIVERSITY ASSOCIATES DEVELOPMENT - ALBANY STREET

Dear Mr. Rossi:

This letter is to confirm that the air quality modeling protocol for the University Associates Albany Street Project, which you described in your letter to me of April 23, 1991 (Ref 751), is acceptable to this office.

Sincerely,

Richard B. Mertens, AICP
Environmental Review Officer

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APPENDIX H

INFRASTRUCTURE

CALCULATIONS

HEATING & AIR CONDITIONING

Building No. 1 Garage 352,000 sq. ft.

Heating

Day Care (area 12,314 sq. ft.)

Wall	4150 x 0.10 x 70	29,050	BTUH
Glass	1700 x 0.50 x 70	52,500	BTUH
Roof	12,314 x 0.12 x 70	103,437	BTUH
Ventilation	12,314 x 0.2 x 70 x 1.08	186,187	BTUH
		378,175	BTUH
	Safety	56,726	BTUH
	Total	434,901	BTUH

Retail (Area 6,523 sq. ft.)

Wall	3185 x 0.10 x 70	22,295	BTUH
Glass	1365 x 0.50 x 70	47,775	BTUH
Roof	6523 x 0.12 x 70	54,793	BTUH
Ventilation	6523 x 0.25 x 70 x 1.08	123,284	BTUH
		248,147	BTUH
	Safety	37,222	BTUH
	Total	285,369	BTUH

Cooling

Day Care

1 Ton/350 sq. ft.
Total Cooling = 12,314/350 = 40 Tons

Retail

1 Ton/200 sq. ft.
Total Cooling = 6523/200 = 33 Tons

For cooling use split system equipment. No domestic cold water make-up required.

Building No. 2 Research/Office (180,000 sq. ft.)

Heating

Research/Office

Wall	76,908 x 0.10 x 70	538,356	BTUH
Glass	21,692 x 0.50 x 70	759,220	BTUH
Roof	20,000 x 0.12 x 70	168,000	BTUH
Ventilation	240,000 x 1.08 x 70	18,144,000	BTUH
		19,609,576	BTUH
	Safety	2,941,436	BTUH
	Total	22,551,012	BTUH

Retail (5400 sq. ft.)

Wall	3185 x 0.10 x 70	22,295	BTUH
Glass	1365 x 0.50 x 70	47,775	BTUH
Roof	5400 x 0.12 x 70	45,360	BTUH
Ventilation	5400 x 0.25 x 70 x 1.08	102,060	BTUH
		217,490	BTUH
	Safety	32,623	BTUH
	Total	250,113	BTUH

Cooling

Research/Office

1 ton/100 sq. ft.

Total cooling = 180,000/100 = 1800 Tons

Retail

1 Ton/200 sq. ft.

Total cooling = 5400/200 = 27 Tons

Domestic cold water make-up for A.C.

Research/office

G.P.M. = 1800 Tons x 3 GPM/Ton x 0.015 = 81 GPM

G.P.D. = 81 GPM x 60 Min/Hr x 12 EFLH = 58,320

Retail

G.P.M. = 27 Tons x 3 GPM/Ton x 0.015 = 1.2

G.P.D. = 1.2 GPM x 60 Min/Hr x 10 EFLH = 730

Building No. 3 Medical Arts/Office Bldg. (160,000 sq. ft.)

Heating

Office Bldg. (154,600 sq. ft.)

Wall	46,200 x 0.10 x 70	323,400	BTUH
Glass	19,800 x 0.50 x 70	693,000	BTUH
Roof	20,000 x 0.12 x 70	168,000	BTUH
Ventilation	154,600 x 0.2 x 1.08 x 70	2,337,552	BTUH
		3,521,952	BTUH
	Safety	528,292	BTUH
	Total	4,050,244	BTUH

Retail (5400 sq. ft.)

Wall	3185 x 0.10 x 70	22,300	BTUH
Glass	1365 x 0.50 x 70	47,800	BTUH
Roof	0	0	BTUH
Ventilation	5,400 x 0.25 x 70 x 1.08	102,060	BTUH
		172,160	BTUH
	Safety	25,824	BTUH
	Total	197,984	BTUH

Cooling

Medical Office Bldg.

1 Ton/430 sq. ft.

Total cooling 154,600/430 = 360 Tons

Retail

1 Ton/200 sq. ft.

Total cooling = 5400/200 = 27 Tons

Domestic cold water make-up for A.C.

Office Bldg.

G.P.M. = 360 Tons x 3 GPM/Ton x 0.015 = 17

G.P.D. = 17 GPM x 60 Min/Hr x 9 EFLH = 9200

Retail

G.P.M. = 27 Tons x 3 GPM/Ton x 0.015 = 1.2

G.P.M. = 1.2 GPM x 60 Min/Hr x 11 EFLH = 800

Building No. 4 Research/Office (140,500 sq. ft.)

Heating

Wall	46,200 x 0.10 x 70	323,400	BTUH
Glass	19,800 x 0.50 x 70	693,000	BTUH
Roof	16,000 x 0.12 x 70	134,400	BTUH
Ventilation	190,000 x 1.08 x 70	14,364,000	BTUH
		15,514,800	BTUH
	Safety	2,327,220	BTUH
	Total	17,842,020	BTUH

Cooling

1 Ton/100 sq. ft.

Total cooling = 140,500/100 = 1400 Tons

Domestic cold water make-up for A.C.

G.P.M. = 1400 Tons x 3 GPM/Ton x 0.015 = 63

G.P.D. = 63 GPM x 60 Min/Hr x 12 EFLH = 45,360

Building No. 5 Office (160,000 sq. ft.)

Heating

Walls	55,000 x 0.10 x 70	385,000	BTUH
Glass	20,000 x 0.50 x 70	700,000	BTUH
Roof	20,000 x 0.12 x 70	168,000	BTUH
Ventilation	160,000 x 0.20 x 1.08 x 700	2,419,200	BTUH
		3,672,200	BTUH
	Safety	550,830	BTUH
	Total	4,223,030	BTUH

Cooling

1 Ton/380 sq. ft.

Total Cooling = 160,000/380 = 425 Tons

Domestic cold water make-up for A.C.

G.P.M. = 425 Tons x 3 GPM/Ton x 0.015 = 19

G.P.M. = 19 GPM x 60 Min/Hr x 10 EFLH = 11,400 GPM

Building No. 6 Hotel (166,000 sq. ft.) (240 rooms)

Heating			
Walls	55,000 x 0.10 x 70	385,000	BTUH
Glass	18,500 x 0.50 x 70	648,000	BTUH
Roof	27,000 x 0.12 x 70	227,000	BTUH
Ventilation			
a) Corridor	8,000 x 1.08 x 70	605,000	BTUH
b) Public Spaces	10,000 x 1.08 x 70	756,000	BTUH
c) Kitchen/Laundry	20,000 x 1.08 x 70	1,512,000	BTUH
d) Misc. Spaces	4,000 x 1.08 x 700	303,000	BTUH
		4,436,000	BTUH
	Safety	665,000	BTUH
	Total	5,101,000	BTUH

Cooling
1 Ton/450 sq. ft.

Total Cooling = 166,000/450 = 370 Tons

Domestic cold water make-up for A.C.
G.P.M. = 370 Tons x 3 GPM/Ton x 0.015 = 17
G.P.D. = 17 GPM x 60 Min/Hr x 14 EFLH = 14,300

PLUMBING

Building No. 1 Garage

Sewage Load:
- Parking (352,000 sq. ft.)
  - Negligible
- Day Care Center (12,314 sq. ft.)
  - Based on 15 Gal/Day/Person
  - Assume 110 Pupils and Staff
  - 110 x 15 = 1,650 GPD
- Retail (5,400 sq. ft.)
  - Based on 50 GPD/1000 sq. ft.
  - 5,400 x 50/1000 = 270 GPD
- Total Sewage Load = 1,920 GPD

Domestic Water Load:
- Parking
  - Negligible
- Day Care Center
  - Based on 115% of Sewage Load
  - 1,650 x 1.15 = 2,065 GPD
- Retail
  - Based on 115% of Sewage Load
  - 270 x 1.15 = 310 GPD
- Total Domestic Water Load = 2,375 GPD

Domestic Water for AC Make-Up:
- See HVAC Calculations

Domestic Hot Water Load:
- Day Care Ctr. Electric Load 45 KW
- Retail Electric Load 21 KW

Storm Drain Load:
- Based on:
- Q = CIA
- Q = Quantity in Cubic Feet/Second
- C = Coefficient of Surface (non-porous)
- I = Intensity 6 in. (100 year storm)
- A = Area in Acres

- Q = CIA (44,000 sq. ft.) + 25,500 surrounding area
- Q = 0.9 x 6 x 1.6 Acres
- Q = 8.64 CFS

Fire Service Load:
Based on 4 Stand Pipe/1250 GPM

Gas Load:
Retail 100 CFH

Building No. 2 Research/Office

Sewage Load:
Research (150,000 sq. ft.)
Based on 150 GPD/1000 sq. ft.
150,000 x 150/1000 = 22,500 GPD
Office (24,600 sq. ft.)
Based on 75 GPD/1000 sq. ft.
24,600 x 75/1000 = 18,450 sq. ft.
Retail (5,400 sq. ft.)
Based on 5,400 sq. ft.
5,400 x 50/1000 = 270 GPD
Total Sewage Load = 41,220 GPD

Domestic Water Load:
Office Based on 115% of Sewage Load
18,450 x 1.15 = 21,220 GPD
Research Based on 150% of Sewage Load
22,500 x 1.50 = 33,750 GPD
Retail Based on 115% of Sewage Load
270 x 1.15 = 310 GPD
Total Domestic Water Load = 55,280 GPD

Domestic Water for AC Make Up:
See HVAC Calculations

Domestic Hot Water Load:
Office/Research Combined Steam Load 1,560 GPH
Retail Electric Load 20 KW

Storm Drain Load:
Based on:
Q = CIA (20,000 sq. ft.) + 12,000 sq. ft. Surrounding Area
Q = 0.9 x 6 x 0.782
Q = 4.22 CFS

Fire Service Load:
Based on 3 Stand Pipe/1000 GPM

Gas Load:
Research

Incinerators	5,000	CFH
Bunsen Burners	1,000	CFH
Miscellaneous	500	CFH
Total Gas Load	6,500	CFH

Building No. 3 Medical Arts

Sewage Load:
Medical Office (154,600 sq. ft.)
Based on 75 GPD/1000 sq. ft.
154,600 x 75/1000 = 11,600 GPD
Retail (5,400 Sq. ft.)
Based on 50 GPD/1000 sq. ft.
5,400 x 50/1000 = 270 GPD
Total Sewage Load = 11,870 GPD

Domestic Water Load:
Medical Office Based on 115% of Sewage Load
11,600 x 1.15 = 13,340 GPD
Retail Based on 115% of Sewage Load
270 x 1.15 = 310 GPD
Total Domestic Water Load = 13,650 GPD

Domestic Water for AC Make Up:
See HVAC Calculations

Domestic Hot Water Load:
Medical Office Electric Load 200 KW
Retail Electric Load 20 KW

Storm Drain Load
Based on:
Q = CIA (20,000 sq. ft.) + 12,000 sq. ft. Surrounding Area
Q = 0.9 x 6 x 0.782
Q = 4.22 CFS

Fire Service Load:
Based on 3 Stand Pipe/1000 GPM

Gas Load:
Retail 1,000 CFS

Building No. 4 Research/Office

Sewage Load
Research (140,000 sq. ft.)
Based on 150 GPD/1000 sq. ft.
140,000 x 150/1000 = 21,000 GPD
Office (20,000 sq. ft.)
Based on 75 GPD/1000 sq. ft.
20,000 x 75/1000 = 1,500 GPD
Total Sewage Load = 22,500 GPD

Domestic Water Load
Research Based on 150% of Sewage Load
21,000 x 1.50 = 31,500 GPD
Office Based on 115% of Sewage Load
1,500 x 1.15 = 1,725 GPD
Total Domestic Water Load = 33,225 GPD

Domestic Water for AC Make Up:
See HVAC Calculations

Domestic Hot Water Load:
Research/Office Combined Steam Load 1,200 GPH

Storm Drainage Load:
Based on:
Q = CIA (20,000 sq. ft.) + 12,000 sq. ft. Surrounding Grounds
Q = 0.9 x 6 x 0.782
Q = 4.22 CFS

Fire Service Load:
Based on 3 Stand Pipe/1000 GPM

Gas Load
Research

Incinerators	5,000	CFH
Bunsen Burners	800	CFH
Total Gas Load	5,800	CFH

Building No. 5 Office

Sewage Load:
Office (140,000 sq. ft.)
Based on 75 GPD/1000 sq. ft.
140,500 x 75/1000 = 10,600 GPD

Domestic Water Load:
Office Based on 115% of Sewage Load
10,600 x 1.15 = 12,190 GPD

Domestic Water for AC Make Up:
See HVAC Calculations

Domestic Hot Water Load:
Office Electric Load 75 KW

Storm Drain Load
Based on:
Q = CIA (20,000) + 12,000 sq. ft. Surrounding Area
Q = 0.9 x 6 x 0.782
Q = 4.22 CFS

Fire Service Load:
Based on 3 Stand Pipe/1000 GPM

Gas Load: None

Building No. 6 Hotel

Sewage Load
Hotel (240 Rooms)
Based on 110 Gallons per Room
240 x 110 = 26,400 GPD
Restaurant (180 Seats)
Based on 35 Gallons per Seat
180 x 35 = 6,300 GPD
Total Sewage Load = 32,700 GPD

Domestic Water Load:
Hotel Based on 125% of Sewage Load
26,400 x 1.25 = 33,000 GPD
Restaurant Based on 125% of Sewage Load
6,300 x 1.25 = 7,900 GPD
Total Domestic Water Load = 40,900 GPD

Domestic Water for AC Make Up:
See HVAC Calculations

Domestic Hot Water Load

Hotel	750	GPM
Restaurant	200	GPM
Laundry	240	GPM
Total Domestic Hot Water Steamload	1190	GPM

Storm Water Load:
Based on:
Q = CIA (27,000 sq. ft.) + 14,000 sq. ft. Surrounding Area
Q = 0.9 x 6 x 0.942
Q = 5.09 CFS

Fire Service Load:
Based on 5 Stand Pipe/1500 GPM

Gas Load:

Cooking	3,500	CFH
Laundry	1,750	CFH
Total Gas	5,250	CFH

ELECTRICAL

Building No. 1 Garage

LOAD ITEM	WATTS/ SQ.FT.	SQ.FT.	CONNECTED LOAD KVA	DESIGN FACTOR %	SERVICE LOAD KVA	DEMAND FACTOR %	METERED DEMAND KW
Parking		325,000					
Lighting	0.5		176	125	220	67	147
Equipment	0.2		70	50	35	67	23
Mechanical	0.2		70	80	56	67	38
Daycare		12,000					
Lighting	3.0		36	125	45	67	30
Appliance	1.0		12	50	6	67	4
Mechanical	12.0		144	80	115	67	77
Retail	40.0	6,500	260	80	208	67	139
							458

Building No. 2 Research/Office

LOAD ITEM	WATTS/ SQ.FT.	SQ.FT.	CONNECTED LOAD KVA	DESIGN FACTOR %	SERVICE LOAD KVA	DEMAND FACTOR %	METERED DEMAND KW
Lighting	2	174,600	349	125	436	67	292
Appliance							
Labs	20	104,600	2092	30	628	67	421
Support	30	44,000	1320	75	990	67	663
Office	4.5	26,000	117	50	59	67	40
Retail	6	5,400	32	100	32	67	21
Mechanical	25	174,600	4365	80	3492	67	2340
							3777

Building No. 3 Medical Arts

LOAD ITEM	WATTS/ SQ.FT.	SQ.FT.	CONNECTED LOAD KVA	DESIGN FACTOR %	SERVICE LOAD KVA	DEMAND FACTOR %	METERED DEMAND KW
Lighting	2	154,600	309	125	386	67	259
Appliance	5	154,600	773	50	387	67	259
Retail	6	5,400	32	100	32	67	21
Mechanical	13	154,600	2010	80	1608	67	1077
							1616

Building No. 4 Research/Office

LOAD ITEM	WATTS/ SQ.FT.	SQ.FT.	CONNECTED LOAD KVA	DESIGN FACTOR %	SERVICE LOAD KVA	DEMAND FACTOR %	METERED DEMAND KW
Lighting	2	140,000	280	125	350	67	235
Appliance							
Labs	20	84,000	1680	30	504	67	338
Support	30	35,000	1050	75	788	67	528
Office	4.5	21,000	95	50	48	67	32
Mechanical	25	140,000	3500	80	2800	67	1876
							3009

Building No. 5 Office

LOAD ITEM	WATTS/ SQ.FT.	SQ.FT.	CONNECTED LOAD KVA	DESIGN FACTOR %	SERVICE LOAD KVA	DEMAND FACTOR %	METERED DEMAND KW
Lighting	2	160,000	320	125	400	67	268
Appliance	4.5	160,000	720	50	360	67	241
Mechanical	12	160,000	1920	80	1536	67	1029
							1538

Building No. 6 Hotel

LOAD ITEM	WATTS/ SQ.FT.	SQ.FT.	CONNECTED LOAD KVA	DESIGN FACTOR %	SERVICE LOAD KVA	DEMAND FACTOR %	METERED DEMAND KW
Lighting	2	166,000	332	125	415	67	278
Appliance	1	166,000	166	50	83	67	56
Kitchen			400	65	260	67	174
Mechanical	10	166,000	1660	80	1328	67	890
							1398

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APPENDIX I

WIND

Section 1

WIND TUNNEL SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER

In the lowest layer of the atmosphere the wind is slowed down by the drag effect of the numerous features on the earth's surface such as vegetation, the ground roughness and man made structures. Within this atmospheric boundary layer the mean wind speed (mean implying an averaging time of about one hour) generally increase with height until the top of the layer is reached, at which point surface drag no longer plays a role. The height of the boundary layer is variable but, at least in strong winds, the best estimate is that it is about 600m or 2000ft (References 1 and 2).

In wind tunnel tests, it is important to simulate the mean wind speed profile, the wind's turbulence intensity and the length scale of turbulence within the atmospheric boundary layer. Figure 1 shows the boundary layer wind tunnel at the Guelph laboratory of Rowan Williams Davies & Irwin Inc. The model to be tested is mounted near the centre of the 2.4m (8 ft.) diameter turntable, 13m (42 ft.) downwind of the entrance to the working section. All major features and structures within the radius covered by the turntable are modelled in detail thereby assuring their effect on the wind flows around the site being studied is accurately simulated. Upstream of the turntable the terrain roughness is modelled by generalized roughness distributed over the working section's floor. In addition, specially designed turbulence generators are installed at the start of the working section. By varying the floor roughness and turbulence generators the effects of various types of terrain roughness upwind of the turntable can be reproduced at model scale. A detailed explanation of these techniques is given in Reference 3.

In strong winds, the mean speed profile in the atmospheric boundary layer is found to be well represented by the power law expression:

$$U = U_g \, (Z/Z_g)^{\alpha}$$

where

U = mean wind speed
U_g = gradient wind speed (value of U at the top of the boundary layer)
Z = height above ground
Z_g = depth of boundary layer
α = constant.

The exponent, α varies with terrain roughness. The following are representative values:

Type of Terrain	α
Open country with some vegetation	0.14
Suburban areas	0.25
Heavily built city cores	0.33

Figure 2 shows wind speed profiles generated in the boundary layer wind tunnel and compares them with the above power law expression. The wind tunnel speed profile can be seen to follow the power law relation well for each type of the boundary layer.

The wind turbulence intensity may be quantified by defining it as the ratio u'/U where u' = root-mean-square of the velocity fluctuations in the direction of the mean wind velocity. The turbulence intensity increases as the terrain roughness increases and is generally greater near to the ground. Figure 3 shows the measured turbulence intensities for each of the simulated atmospheric boundary layers described above. Some full scale data are included for comparison (obtained from Ref. 4).

The integral scale of the turbulence, which can be thought of as an average size of turbulence eddy, is on the order of 150m (500 ft.) high up in the planetary boundary layer but decreases significantly near to the ground. For a 1:400 scale model of the appropriate integral scale of the wind tunnel turbulence should therefore be about 0.375m (1.25 ft.) in the upper part of the boundary layer. One way of measuring the integral scale is to measure the power spectrum, S, of longitudinal turbulence and comparing it in non-dimensional form with the theoretical von Karman spectrum,

$$\frac{nS}{u'^{2}} = \frac{4\,(nL/U)}{[1 + 70.78\,(nL/U)^{2}]^{5/6}}$$

which has been found to agree well with full scale spectra obtained in high winds. The measured spectrum is plotted against nL/U, the value of L being adjusted until a best fit to the von Karman expression is obtained. This value of L is then the integral scale of the turbulence in the wind tunnel. Figure 4 shows a typical comparison between the measured spectrum in the wind tunnel and the von Karman spectrum, and indicates the equivalent full scale value of L obtained. It corresponds well to typical full scale values and the shape of the wind tunnel turbulence spectrum closely follows the von Karman curve.

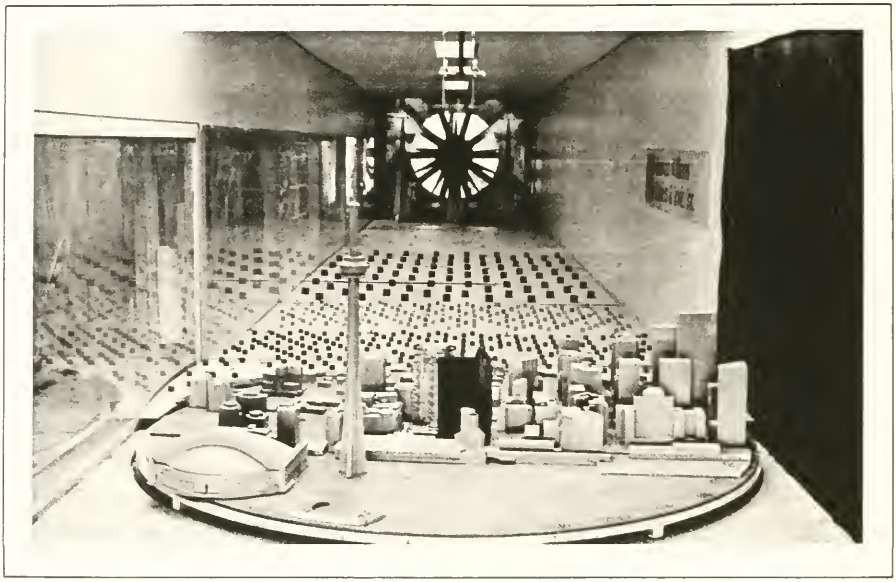
References

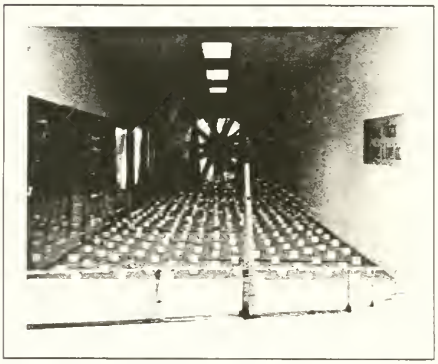
1. Counihan, J. — Adiabatic Atmospheric Boundary Layer: A Review of Data from the Period 1880-1972", Atmospheric Environment, V. 9, No. 10, pp. 871-905, 1975.

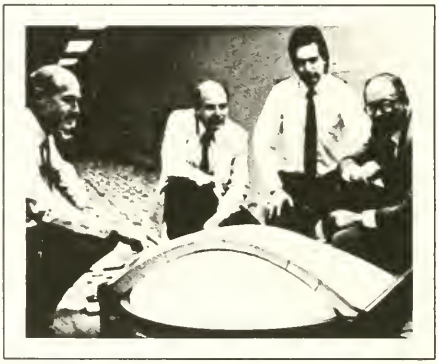
2. Snyder, W. H. — "Guideline for Fluid Modeling of Atmospheric Diffusion", U.S. Environmental Protection Agency, Report 600/8-81-009, 1981.

3. Irwin, P. A. — "Design and Use of Spires for Natural Wind Simulation", National Research Council of Canada, N.A.E. Report LTR-LA-233, 1979.

4. Engineering Sciences — "Characteristics of Atmospheric Turbulence Data Unit Near the Ground: Part III, Variations in Space and Time for Strong Winds," Engineering Sciences Data Item Number 750001, London, England, 1975.







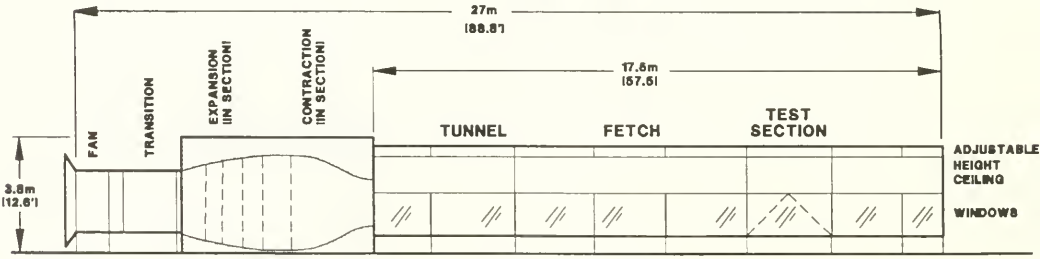
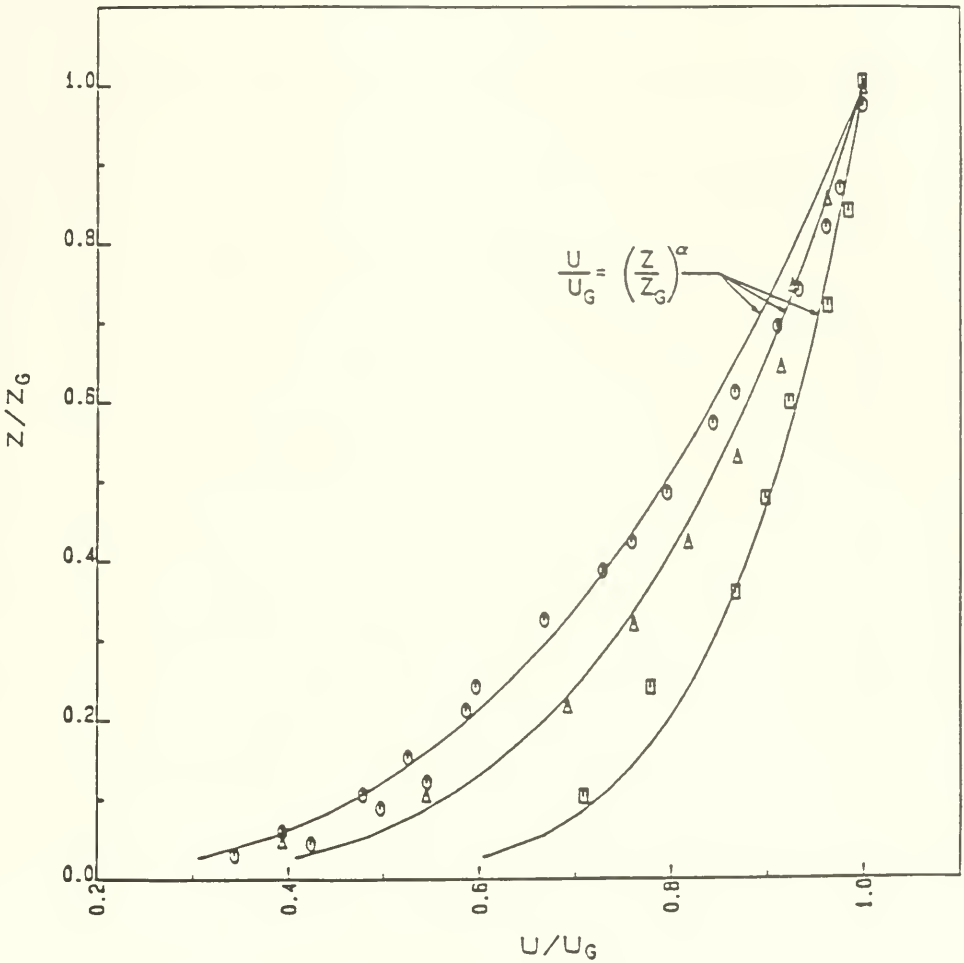
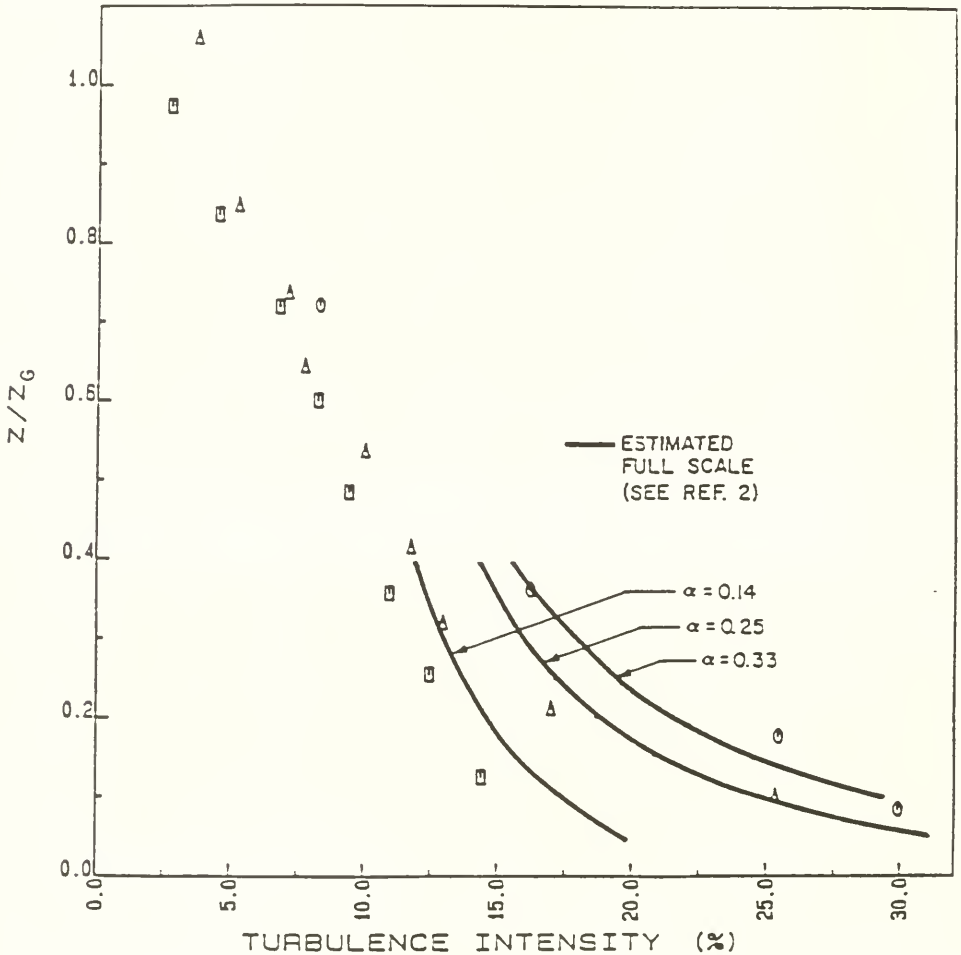


Figure 1: 1.9 m x 2.4 m Boundary Layer Wind Tunnel Facility



SYMBOL	α	Z_G
⊙	.33	600m (2000ft)
△	.25	600m (2000ft)
⊡	.14	600m (2000ft)

Figure 2: Simulated Mean Wind Speed Profile



WIND SIMULATION DATA

SYMBOL	α	Z_G
⊙	.33	600m (2000 ft)
△	.25	600m (2000 ft)
⊡	.14	600m (2000 ft)

Figure 3: Simulated and Full Scale Longitudinal Turbulence Intensity Profiles

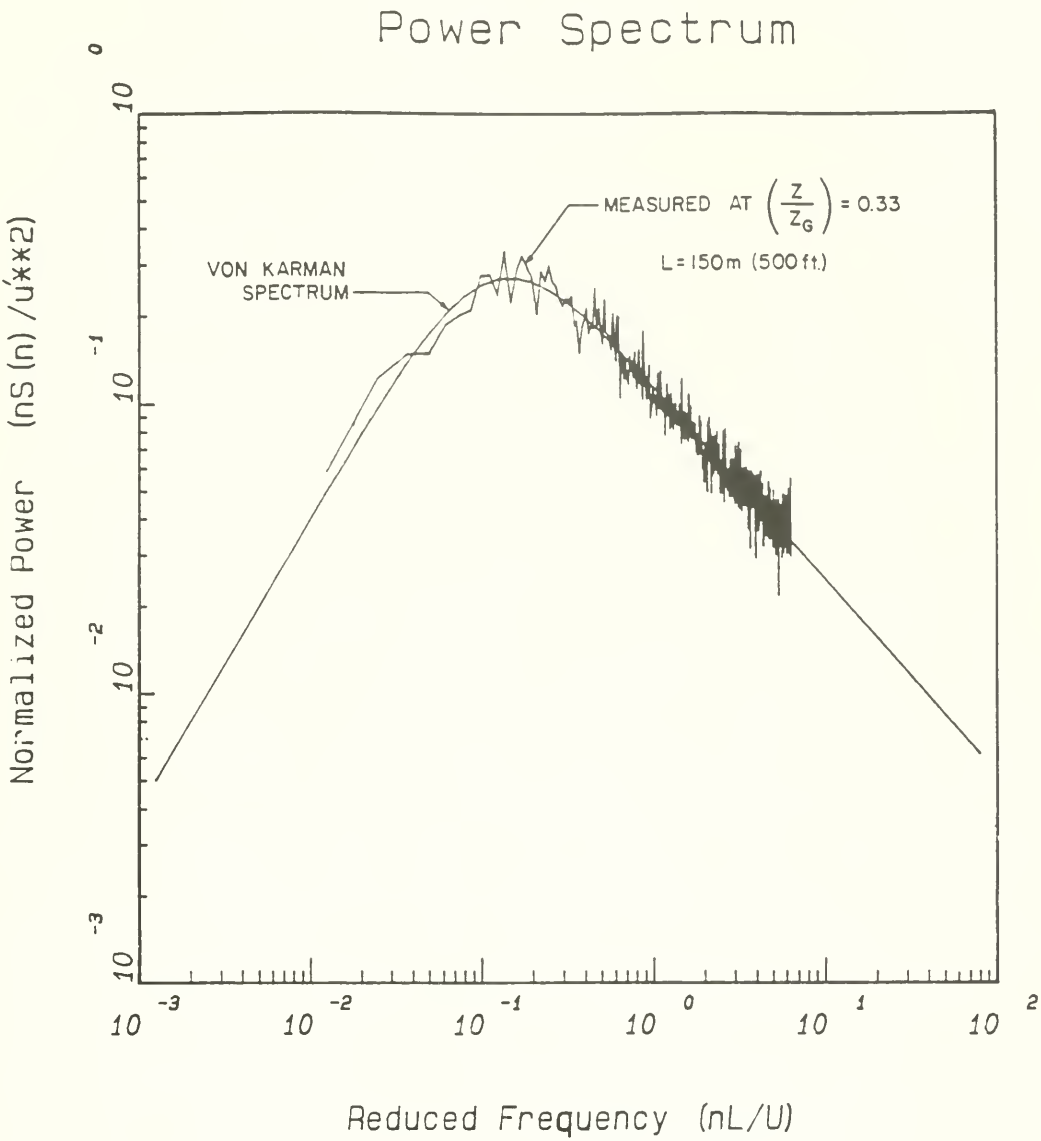


Figure 4: Typical Spectrum of the Longitudinal Wind Velocity Component Measured Over the Test Site for α = 0.33

Section 2

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 15 20 25 29+
1	A		11	■■■■■
	B		12	■■■■■■■
	C		12	■■■■■■■
2	A		15	■■■■■■■■■■■■■■
	B	- 20	12	■■■■■■■
	C	- 13	13	■■■■■■■■■
3	A		14	■■■■■■■■■■■
	B	+ 35	19	■■■■■■■■■■■■■■■■■■■■■■
	C	+ 35	19	■■■■■■■■■■■■■■■■■■■■■■
4	A		18	■■■■■■■■■■■■■■■■■■■
	B		19	■■■■■■■■■■■■■■■■■■■■■■
	C		18	■■■■■■■■■■■■■■■■■■■
5	A		16	■■■■■■■■■■■■■■■■
	B		17	■■■■■■■■■■■■■■■■■■
	C		17	■■■■■■■■■■■■■■■■■■
6	A		14	■■■■■■■■■■■
	B		13	■■■■■■■■■
	C		14	■■■■■■■■■■■
7	A		12	■■■■■■■
	B	+ 16	14	■■■■■■■■■■■
	C		12	■■■■■■■
8	A		14	■■■■■■■■■■■
	B	- 14	12	■■■■■■■
	C		13	■■■■■■■■■
9	A		15	■■■■■■■■■■■■■■
	B		14	■■■■■■■■■■■
	C	- 13	13	■■■■■■■■■
10	A		14	■■■■■■■■■■■
	B	- 21	11	■■■■■
	C	- 14	12	■■■■■■■
11	A		14	■■■■■■■■■■■
	B	- 21	11	■■■■■
	C		15	■■■■■■■■■■■■■■
12	A		14	■■■■■■■■■■■
	B		13	■■■■■■■■■
	C	- 28	10	■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B1

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SPRING MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> (MPH) <------ ACCEPTABLE ------> 31 <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
1	A		18	■■■■■■■■■
	B		18	■■■■■■■■■
	C		19	■■■■■■■■■■
2	A		21	■■■■■■■■■■■■
	B	- 14	18	■■■■■■■■■
	C		19	■■■■■■■■■■
3	A		22	■■■■■■■■■■■■■
	B	+ 31	29	■■■■■■■■■■■■■■■■■■■■
	C	+ 36	30	■■■■■■■■■■■■■■■■■■■■■■
4	A		25	■■■■■■■■■■■■■■■■
	B	+ 16	29	■■■■■■■■■■■■■■■■■■■■
	C	+ 12	28	■■■■■■■■■■■■■■■■■■■
5	A		26	■■■■■■■■■■■■■■■■■■
	B		28	■■■■■■■■■■■■■■■■■■■■
	C		28	■■■■■■■■■■■■■■■■■■■
6	A		23	■■■■■■■■■■■■■■
	B		22	■■■■■■■■■■■■■
	C		23	■■■■■■■■■■■■■■
7	A		20	■■■■■■■■■■■
	B	+ 15	23	■■■■■■■■■■■■■■
	C		21	■■■■■■■■■■■■
8	A		20	■■■■■■■■■■■
	B	- 10	18	■■■■■■■■■
	C		19	■■■■■■■■■■
9	A		23	■■■■■■■■■■■■■■
	B		21	■■■■■■■■■■■■
	C	- 17	19	■■■■■■■■■■
10	A		21	■■■■■■■■■■■■
	B	- 14	18	■■■■■■■■■
	C		19	■■■■■■■■■■
11	A		21	■■■■■■■■■■■■
	B	- 14	18	■■■■■■■■■
	C		23	■■■■■■■■■■■■■■
12	A		21	■■■■■■■■■■■■
	B		20	■■■■■■■■■■■
	C	- 23	16	■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B2

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SPRING EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING | 15 STANDING | 19 WALKING | 27 UNCOMFORTABLE FOR WALKING | DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 : 15 : 20 : 25 : 29+ :
13	A		15	**********
	B	- 20	12	*******
	C	- 20	12	*******
14	A		14	**********
	B		15	**********
	C		15	**********
15	A		13	*********
	B		14	**********
	C		13	*********
16	A		16	**********
	B	- 50	8	<
	C	- 50	8	<
17	A		15	**********
	B	+ 20	18	**********
	C	+ 26	19	**********
18	A		14	**********
	B	+ 21	17	**********
	C	+ 28	18	**********
19	A		13	*********
	B		14	**********
	C		14	**********
20	A		15	**********
	B	- 13	13	*********
	C	- 13	13	*********
21	A		14	**********
	B	- 21	11	*****
	C	- 21	11	*****
22	A		16	**********
	B	- 43	9	*
	C	- 43	9	*
23	A		15	**********
	B	- 20	12	*******
	C	- 13	13	*********
24	A		18	**********
	B	- 38	11	*****
	C	- 33	12	*******

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B3

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SPRING MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR (MPH) ------> <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
13	A		22	**********
	B	- 13	16	**********
	C	- 13	19	**********
14	A		21	**********
	B	+ 19	25	**********
	C	+ 19	25	**********
15	A		21	**********
	B		23	**********
	C		23	**********
16	A		23	**********
	B	- 39	14	*****
	C	- 39	14	*****
17	A		23	**********
	B	+ 17	27	**********
	C	+ 26	29	**********
18	A		21	**********
	B	+ 28	27	**********
	C	+ 28	27	**********
19	A		19	**********
	B	+ 21	23	**********
	C	+ 21	23	**********
20	A		22	**********
	B		20	**********
	C		20	**********
21	A		22	**********
	B	- 18	18	**********
	C	- 18	18	**********
22	A		25	**********
	B	- 44	14	*****
	C	- 44	14	*****
23	A		23	**********
	B		21	**********
	C		21	**********
24	A		25	**********
	B	- 36	16	*******
	C	- 32	17	********

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B4

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SPRING EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR -------> (MPH)

12 SITTING | 15 STANDING | 19 WALKING | 27 UNCOMFORTABLE FOR WALKING | DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 15 20 25 29+
25	A		16	■■■■■■■■■■■■■■■
	B	- 43	9	■
	C	- 31	11	■■■■■
26	A		16	■■■■■■■■■■■■■■■
	B	- 31	11	■■■■■
	C	- 18	13	■■■■■■■■■
27	A		18	■■■■■■■■■■■■■■■■■■■
	B	- 33	12	■■■■■■■
	C	- 11	16	■■■■■■■■■■■■■■■
28	A		17	■■■■■■■■■■■■■■■■
	B	- 23	13	■■■■■■■■■
	C		16	■■■■■■■■■■■■■■■
29	A		15	■■■■■■■■■■■■■
	B	+ 26	19	■■■■■■■■■■■■■■■■■■■■■
	C	+ 20	18	■■■■■■■■■■■■■■■■■■■
30	A		14	■■■■■■■■■■■
	B	- 21	11	■■■■■
	C	- 21	11	■■■■■
31	A		16	■■■■■■■■■■■■■■■
	B	+ 18	19	■■■■■■■■■■■■■■■■■■■■■
	C		16	■■■■■■■■■■■■■■■
32	A		15	■■■■■■■■■■■■■
	B		16	■■■■■■■■■■■■■■■
	C	- 13	13	■■■■■■■■■
33	A		15	■■■■■■■■■■■■■
	B	- 46	8	<
	C	- 40	9	■
34	A		16	■■■■■■■■■■■■■■■
	B	- 12	14	■■■■■■■■■■■
	C	- 50	8	<
35	A		17	■■■■■■■■■■■■■■■■
	B	- 17	14	■■■■■■■■■■■
	C	- 17	14	■■■■■■■■■■■
36	A		15	■■■■■■■■■■■■■
	B		14	■■■■■■■■■■■
	C	- 20	12	■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A 2000 FUTURE NO-BUILD CONDITION
B 1993 PHASE I BUILD CONDITION
C 2000 FULL-BUILD CONDITION

TABLE WIND-B5

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SPRING MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> (MPH) <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
25	A		24	■■■■■■■■■■■■■■■
	B	- 45	13	■■■■
	C	- 25	18	■■■■■■■■■
26	A		22	■■■■■■■■■■■■■
	B	- 13	19	■■■■■■■■■■
	C		20	■■■■■■■■■■■
27	A		25	■■■■■■■■■■■■■■■■
	B	- 20	20	■■■■■■■■■■■
	C		25	■■■■■■■■■■■■■■■■
28	A		24	■■■■■■■■■■■■■■■
	B	- 16	20	■■■■■■■■■■■
	C		24	■■■■■■■■■■■■■■■
29	A		23	■■■■■■■■■■■■■■
	B	+ 17	27	■■■■■■■■■■■■■■■■■■
	C	+ 17	27	■■■■■■■■■■■■■■■■■■
30	A		22	■■■■■■■■■■■■■
	B		20	■■■■■■■■■■■
	C		21	■■■■■■■■■■■■
31	A		24	■■■■■■■■■■■■■■■
	B	+ 16	28	■■■■■■■■■■■■■■■■■■■
	C		26	■■■■■■■■■■■■■■■■■
32	A		23	■■■■■■■■■■■■■■
	B	+ 13	26	■■■■■■■■■■■■■■■■■
	C		22	■■■■■■■■■■■■■
33	A		22	■■■■■■■■■■■■■
	B	- 45	12	■■■
	C	- 40	13	■■■■
34	A		23	■■■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■
	C	- 47	12	■■■
35	A		24	■■■■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■
	C		22	■■■■■■■■■■■■■
36	A		23	■■■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■
	C	- 17	19	■■■■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B6

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SPRING EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 15 20 25 29+
37	A		16	■■■■■■■■■■■■■■■
	B		15	■■■■■■■■■■■■■
	C	- 43	9	■
38	A		16	■■■■■■■■■■■■■■■
	B		16	■■■■■■■■■■■■■■■
	C	- 43	9	■
39	A		15	■■■■■■■■■■■■■
	B	- 13	13	■■■■■■■■■
	C		14	■■■■■■■■■■■
40	A		14	■■■■■■■■■■■
	B		14	■■■■■■■■■■■
	C	- 28	10	■■■
41	A		14	■■■■■■■■■■■
	B	- 14	12	■■■■■■■
	C		13	■■■■■■■■■
42	A		16	■■■■■■■■■■■■■■■
	B	- 18	13	■■■■■■■■■
	C	- 12	14	■■■■■■■■■■■
43	A		17	■■■■■■■■■■■■■■■■■
	B	- 11	15	■■■■■■■■■■■■■
	C	- 35	11	■■■■■
44	A		16	■■■■■■■■■■■■■■■
	B	- 37	10	■■■
	C	- 56	7	<
45	A		16	■■■■■■■■■■■■■■■
	B	- 31	11	■■■■■
	C	- 12	14	■■■■■■■■■■■
46	A		17	■■■■■■■■■■■■■■■■■
	B	- 29	12	■■■■■■■
	C	- 23	13	■■■■■■■■■
47	A		17	■■■■■■■■■■■■■■■■■
	B	- 35	11	■■■■■
	C	- 58	7	<
48	A		17	■■■■■■■■■■■■■■■■■
	B	- 29	12	■■■■■■■
	C	- 29	12	■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A 2000 FUTURE NO-BUILD CONDITION
B 1993 PHASE I BUILD CONDITION
C 2000 FULL-BUILD CONDITION

TABLE WIND-B7

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SPRING MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> (MPH)

<------ ACCEPTABLE ------> 31 <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
37	A		23	■■■■■■■■■■■■■■
	B		24	■■■■■■■■■■■■■■■
	C	- 43	13	■■■■
38	A		24	■■■■■■■■■■■■■■■
	B		24	■■■■■■■■■■■■■■■
	C	- 45	13	■■■■
39	A		22	■■■■■■■■■■■■■
	B		21	■■■■■■■■■■■■
	C		21	■■■■■■■■■■■■
40	A		22	■■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■
	C	- 31	15	■■■■■■
41	A		21	■■■■■■■■■■■■
	B		20	■■■■■■■■■■■
	C		19	■■■■■■■■■■
42	A		25	■■■■■■■■■■■■■■■■
	B	- 16	21	■■■■■■■■■■■■
	C	- 20	20	■■■■■■■■■■■
43	A		24	■■■■■■■■■■■■■■■
	B		22	■■■■■■■■■■■■■
	C	- 20	19	■■■■■■■■■■
44	A		24	■■■■■■■■■■■■■■■
	B	- 29	17	■■■■■■■■
	C	- 54	11	■■
45	A		23	■■■■■■■■■■■■■■
	B	- 26	17	■■■■■■■■
	C	- 13	20	■■■■■■■■■■■
46	A		24	■■■■■■■■■■■■■■■
	B	- 25	18	■■■■■■■■■
	C	- 16	20	■■■■■■■■■■■
47	A		24	■■■■■■■■■■■■■■■
	B	- 20	19	■■■■■■■■■■
	C	- 58	10	■
48	A		25	■■■■■■■■■■■■■■■■■
	B	- 20	20	■■■■■■■■■■■
	C	- 28	18	■■■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B8

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SPRING EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ———> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10	15	20	25	29+
49	A		17	■■■■■■■■■■■■■■■■■				
	B	- 23	13	■■■■■■■■■				
	C	- 35	11	■■■■■				
50	A		17	■■■■■■■■■■■■■■■■■				
	B		16	■■■■■■■■■■■■■■■				
	C	- 29	12	■■■■■■■				
51	A		19	■■■■■■■■■■■■■■■■■■■■■				
	B		18	■■■■■■■■■■■■■■■■■■■				
	C	- 10	17	■■■■■■■■■■■■■■■■■				

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B9

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SPRING MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> (MPH) <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
49	A		24	■■■■■■■■■■■■■■■
	B	- 20	19	■■■■■■■■■■■
	C	- 29	17	■■■■■■■■
50	A		25	■■■■■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■
	C	- 24	19	■■■■■■■■■■■
51	A		30	■■■■■■■■■■■■■■■■■■■■■■
	B	- 10	27	■■■■■■■■■■■■■■■■■■■
	C	- 10	27	■■■■■■■■■■■■■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B10

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SPRING EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING | 15 STANDING | 19 WALKING | 27 UNCOMFORTABLE FOR WALKING | DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 : 15 : 20 : 25 : 29+ :
1	A		9	■
	B	+ 11	10	■■■
	C	+ 11	10	■■■
2	A		11	■■■■■
	B		10	■■■
	C		11	■■■■■
3	A		11	■■■■■
	B	+ 27	14	■■■■■■■■■■■
	C	+ 36	15	■■■■■■■■■■■■■
4	A		14	■■■■■■■■■■■
	B		15	■■■■■■■■■■■■■
	C		14	■■■■■■■■■■■
5	A		14	■■■■■■■■■■■
	B		13	■■■■■■■■■
	C		13	■■■■■■■■■
6	A		12	■■■■■■■
	B		11	■■■■■
	C		11	■■■■■
7	A		10	■■■
	B	+ 10	11	■■■■■
	C		10	■■■
8	A		12	■■■■■■■
	B	- 25	9	■
	C	- 16	10	■■■
9	A		11	■■■■■
	B		11	■■■■■
	C		10	■■■
10	A		11	■■■■■
	B	- 18	9	■
	C	- 18	9	■
11	A		12	■■■■■■■
	B	- 25	9	■
	C		11	■■■■■
12	A		12	■■■■■■■
	B	- 16	10	■■■
	C	- 33	8	<

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A 2000 FUTURE NO-BUILD CONDITION
B 1993 PHASE I BUILD CONDITION
C 2000 FULL-BUILD CONDITION

TABLE WIND-B11

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SUMMER MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> (MPH)

<------ ACCEPTABLE ------> 31 <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
1	A		14	■■■■■
	B		15	■■■■■■
	C	+ 14	16	■■■■■■■
2	A		16	■■■■■■■
	B		15	■■■■■■
	C		16	■■■■■■■
3	A		17	■■■■■■■■
	B	+ 35	23	■■■■■■■■■■■■■■
	C	+ 35	23	■■■■■■■■■■■■■■
4	A		21	■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■
	C		22	■■■■■■■■■■■■■
5	A		22	■■■■■■■■■■■■■
	B		22	■■■■■■■■■■■■■
	C		22	■■■■■■■■■■■■■
6	A		19	■■■■■■■■■■
	B		18	■■■■■■■■■
	C		18	■■■■■■■■■
7	A		16	■■■■■■■
	B		17	■■■■■■■■
	C		16	■■■■■■■
8	A		17	■■■■■■■■
	B	- 23	13	■■■■
	C	- 11	15	■■■■■■
9	A		18	■■■■■■■■■
	B		17	■■■■■■■■
	C	- 16	15	■■■■■■
10	A		17	■■■■■■■■
	B	- 17	14	■■■■■
	C	- 17	14	■■■■■
11	A		17	■■■■■■■■
	B	- 17	14	■■■■■
	C		17	■■■■■■■■
12	A		18	■■■■■■■■■
	B	- 11	16	■■■■■■■
	C	- 27	13	■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B12

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SUMMER EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING | 15 STANDING | 19 WALKING | 27 UNCOMFORTABLE FOR WALKING | DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 15 20 25 29+
13	A		13	■■■■■■■■■
	B	- 30	9	■
	C	- 30	9	■
14	A		12	■■■■■■■
	B		12	■■■■■■■
	C		12	■■■■■■■
15	A		10	■■■
	B	+ 10	11	■■■■■
	C		10	■■■
16	A		12	■■■■■■■
	B	- 41	7	<
	C	- 41	7	<
17	A		12	■■■■■■■
	B	+ 25	15	■■■■■■■■■■■■■
	C	+ 41	17	■■■■■■■■■■■■■■■■■
18	A		11	■■■■■
	B	+ 36	15	■■■■■■■■■■■■■
	C	+ 36	15	■■■■■■■■■■■■■
19	A		10	■■■
	B	+ 10	11	■■■■■
	C	+ 10	11	■■■■■
20	A		11	■■■■■
	B		11	■■■■■
	C		11	■■■■■
21	A		11	■■■■■
	B	- 18	9	■
	C	- 18	9	■
22	A		13	■■■■■■■■■
	B	- 38	8	<
	C	- 38	8	<
23	A		12	■■■■■■■
	B	- 16	10	■■■
	C	- 16	10	■■■
24	A		15	■■■■■■■■■■■■■
	B	- 46	8	<
	C	- 40	9	■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B13

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SUMMER MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> (MPH)

<------ ACCEPTABLE ------> 31 <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
13	A		19	**********
	B	- 21	15	******
	C	- 21	15	******
14	A		18	*********
	B		19	**********
	C	+ 11	20	**********
15	A		17	********
	B		18	*********
	C		17	********
16	A		19	**********
	B	- 47	10	*
	C	- 42	11	**
17	A		18	*********
	B	+ 27	23	**********
	C	+ 44	26	**********
18	A		17	********
	B	+ 35	23	**********
	C	+ 41	24	**********
19	A		16	*******
	B		17	********
	C	+ 12	18	*********
20	A		17	********
	B		17	********
	C		18	*********
21	A		17	********
	B	- 11	15	******
	C	- 11	15	******
22	A		20	**********
	B	- 35	13	****
	C	- 40	12	***
23	A		19	**********
	B	- 10	17	********
	C	- 10	17	********
24	A		21	**********
	B	- 42	12	***
	C	- 38	13	****

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B14

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SUMMER EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR -------> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 : 15 : 20 : 25 : 29+ :
25	A		13	*********
	B	- 46	7	<
	C	- 30	9	*
26	A		11	*****
	B	- 27	8	<
	C		11	*****
27	A		14	**********
	B	- 35	9	*
	C		13	*********
28	A		14	**********
	B	- 14	12	*******
	C	- 14	12	*******
29	A		13	*********
	B		14	**********
	C		14	**********
30	A		11	*****
	B	- 18	9	*
	C	- 18	9	*
31	A		13	*********
	B	+ 15	15	**********
	C		13	*********
32	A		13	*********
	B	+ 15	15	**********
	C	- 15	11	*****
33	A		12	*******
	B	- 41	7	<
	C	- 41	7	<
34	A		13	*********
	B		13	*********
	C	- 46	7	<
35	A		14	**********
	B	- 14	12	*******
	C	- 21	11	*****
36	A		12	*******
	B		11	*****
	C	- 16	10	***

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B15

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SUMMER MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ——> (MPH) <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
25	A		20	**********
	B	- 45	11	**
	C	- 30	14	*****
26	A		17	********
	B	- 17	14	*****
	C		17	********
27	A		21	**********
	B	- 23	16	*******
	C		21	**********
28	A		20	**********
	B	- 10	18	*********
	C	- 10	18	*********
29	A		20	**********
	B		20	**********
	C		20	**********
30	A		18	*********
	B	- 11	16	*******
	C		17	********
31	A		20	**********
	B	+ 15	23	**********
	C		21	**********
32	A		20	**********
	B	+ 20	24	**********
	C	- 10	18	*********
33	A		19	**********
	B	- 47	10	*
	C	- 42	11	**
34	A		19	**********
	B		20	**********
	C	- 52	9	<
35	A		20	**********
	B		19	**********
	C	- 10	18	*********
36	A		19	**********
	B		18	*********
	C	- 21	15	******

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B16

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SUMMER EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 : 15 : 20 : 25 : 29+ :
37	A		13	*********
	B		13	*********
	C	- 46	7	<
38	A		13	*********
	B		13	*********
	C	- 46	7	<
39	A		12	*******
	B		11	*****
	C	- 16	10	***
40	A		13	*********
	B		13	*********
	C	- 46	7	<
41	A		12	*******
	B	- 16	10	***
	C	- 16	10	***
42	A		13	*********
	B	- 23	10	***
	C		12	*******
43	A		14	**********
	B	- 21	11	*****
	C	- 35	9	*
44	A		13	*********
	B	- 38	8	<
	C	- 53	6	<
45	A		13	*********
	B	- 30	9	*
	C	- 23	10	***
46	A		14	**********
	B	- 35	9	*
	C	- 28	10	***
47	A		14	**********
	B	- 35	9	*
	C	- 57	6	<
48	A		14	**********
	B	- 21	11	*****
	C	- 28	10	***

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B17

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SUMMER MEAN WIND SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 : 15 : 20 : 25 : 29+ :
49	A		14	■■■■■■■■■■■
	B	- 28	10	■■■
	C	- 35	9	■
50	A		15	■■■■■■■■■■■■■■
	B	- 20	12	■■■■■■■
	C	- 33	10	■■■
51	A		14	■■■■■■■■■■■
	B		13	■■■■■■■■■
	C		13	■■■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B19

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SUMMER MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR (MPH) ------> <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 ! 40 : 50+ :
49	A		20	■■■■■■■■■■■
	B	- 20	16	■■■■■■■
	C	- 30	14	■■■■■
50	A		21	■■■■■■■■■■■■
	B	- 14	18	■■■■■■■■■
	C	- 23	16	■■■■■■■
51	A		22	■■■■■■■■■■■■■
	B		20	■■■■■■■■■■■
	C		20	■■■■■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B20

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

SUMMER EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR -------> (MPH)

12 SITTING | 15 STANDING | 19 WALKING | 27 UNCOMFORTABLE FOR WALKING | DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 : 15 : 20 : 25 : 29+ :
1	A		11	*****
	B		12	*******
	C		12	*******
2	A		14	**********
	B	- 14	12	*******
	C	- 14	12	*******
3	A		13	*********
	B	+ 38	18	**********
	C	+ 38	18	**********
4	A		17	**********
	B		18	**********
	C		18	**********
5	A		16	**********
	B		16	**********
	C		16	**********
6	A		14	**********
	B		13	*********
	C		13	*********
7	A		12	*******
	B		13	*********
	C		12	*******
8	A		13	*********
	B	- 15	11	*****
	C		13	*********
9	A		14	**********
	B		13	*********
	C	- 14	12	*******
10	A		13	*********
	B	- 15	11	*****
	C	- 15	11	*****
11	A		14	**********
	B	- 21	11	*****
	C		14	**********
12	A		14	**********
	B		13	*********
	C	- 28	10	***

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B21

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

AUTUMN MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> (MPH)

<------ ACCEPTABLE ------> 31 <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
1	A		17	▪▪▪▪▪▪▪▪
	B		18	▪▪▪▪▪▪▪▪▪
	C		18	▪▪▪▪▪▪▪▪▪
2	A		20	▪▪▪▪▪▪▪▪▪▪▪
	B	- 10	18	▪▪▪▪▪▪▪▪▪
	C		19	▪▪▪▪▪▪▪▪▪▪
3	A		21	▪▪▪▪▪▪▪▪▪▪▪▪
	B	+ 33	28	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	+ 33	28	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
4	A		24	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	+ 16	28	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	+ 12	27	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
5	A		25	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		27	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C		27	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
6	A		22	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		21	▪▪▪▪▪▪▪▪▪▪▪▪
	C		22	▪▪▪▪▪▪▪▪▪▪▪▪▪
7	A		19	▪▪▪▪▪▪▪▪▪▪
	B	+ 15	22	▪▪▪▪▪▪▪▪▪▪▪▪▪
	C		20	▪▪▪▪▪▪▪▪▪▪▪
8	A		20	▪▪▪▪▪▪▪▪▪▪▪
	B	- 15	17	▪▪▪▪▪▪▪▪
	C	- 10	18	▪▪▪▪▪▪▪▪▪
9	A		22	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		20	▪▪▪▪▪▪▪▪▪▪▪
	C	- 18	18	▪▪▪▪▪▪▪▪▪
10	A		20	▪▪▪▪▪▪▪▪▪▪▪
	B	- 15	17	▪▪▪▪▪▪▪▪
	C	- 10	18	▪▪▪▪▪▪▪▪▪
11	A		20	▪▪▪▪▪▪▪▪▪▪▪
	B	- 15	17	▪▪▪▪▪▪▪▪
	C		21	▪▪▪▪▪▪▪▪▪▪▪▪
12	A		21	▪▪▪▪▪▪▪▪▪▪▪▪
	B		19	▪▪▪▪▪▪▪▪▪▪
	C	- 28	15	▪▪▪▪▪▪

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B22

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

AUTUMN EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR -------> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 15 20 25 29+
13	A		14	■■■■■■■■■■■
	B	- 21	11	■■■■■
	C	- 21	11	■■■■■
14	A		13	■■■■■■■■■
	B		14	■■■■■■■■■■■
	C		14	■■■■■■■■■■■
15	A		12	■■■■■■■
	B		13	■■■■■■■■■
	C		13	■■■■■■■■■
16	A		15	■■■■■■■■■■■■■
	B	- 46	8	<
	C	- 46	8	<
17	A		14	■■■■■■■■■■■
	B	+ 21	17	■■■■■■■■■■■■■■■■■
	C	+ 35	19	■■■■■■■■■■■■■■■■■■■■■
18	A		13	■■■■■■■■■
	B	+ 30	17	■■■■■■■■■■■■■■■■■
	C	+ 38	18	■■■■■■■■■■■■■■■■■■■
19	A		12	■■■■■■■
	B		13	■■■■■■■■■
	C		13	■■■■■■■■■
20	A		14	■■■■■■■■■■■
	B	- 14	12	■■■■■■■
	C		13	■■■■■■■■■
21	A		13	■■■■■■■■■
	B	- 15	11	■■■■■
	C	- 15	11	■■■■■
22	A		15	■■■■■■■■■■■■■
	B	- 40	9	■
	C	- 46	8	<
23	A		15	■■■■■■■■■■■■■
	B	- 26	11	■■■■■
	C	- 20	12	■■■■■■■
24	A		18	■■■■■■■■■■■■■■■■■■
	B	- 44	10	■■■
	C	- 38	11	■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B23

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

AUTUMN MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> MPH <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
13	A		22	■■■■■■■■■■■■■
	B	- 18	18	■■■■■■■■■
	C	- 18	18	■■■■■■■■■
14	A		21	■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■
	C	+ 14	24	■■■■■■■■■■■■■■■
15	A		20	■■■■■■■■■■■
	B	+ 10	22	■■■■■■■■■■■■■
	C		21	■■■■■■■■■■■■
16	A		23	■■■■■■■■■■■■■■
	B	- 43	13	■■■■
	C	- 43	13	■■■■
17	A		22	■■■■■■■■■■■■■
	B	+ 22	27	■■■■■■■■■■■■■■■■■■
	C	+ 31	29	■■■■■■■■■■■■■■■■■■■■■
18	A		20	■■■■■■■■■■■
	B	+ 30	26	■■■■■■■■■■■■■■■■■
	C	+ 35	27	■■■■■■■■■■■■■■■■■■
19	A		19	■■■■■■■■■■
	B	- 15	22	■■■■■■■■■■■■■
	C	+ 15	22	■■■■■■■■■■■■■
20	A		21	■■■■■■■■■■■■
	B		19	■■■■■■■■■■
	C		20	■■■■■■■■■■■
21	A		21	■■■■■■■■■■■■
	B	- 19	17	■■■■■■■■
	C	- 19	17	■■■■■■■■
22	A		24	■■■■■■■■■■■■■■■
	B	- 41	14	■■■■■
	C	- 41	14	■■■■■
23	A		22	■■■■■■■■■■■■■
	B	- 13	19	■■■■■■■■■■
	C		20	■■■■■■■■■■■
24	A		24	■■■■■■■■■■■■■■■
	B	- 37	15	■■■■■■
	C	- 33	16	■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B24

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

AUTUMN EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR -------> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 15 20 25 29+
25	A		16	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 50	8	<
	C	- 37	10	▪▪▪
26	A		15	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 26	11	▪▪▪▪▪
	C	- 20	12	▪▪▪▪▪▪▪
27	A		17	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 35	11	▪▪▪▪▪
	C	- 11	15	▪▪▪▪▪▪▪▪▪▪▪▪▪
28	A		16	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 18	13	▪▪▪▪▪▪▪▪▪
	C		15	▪▪▪▪▪▪▪▪▪▪▪▪▪
29	A		15	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	+ 13	17	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C		16	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
30	A		14	▪▪▪▪▪▪▪▪▪▪▪
	B	- 21	11	▪▪▪▪▪
	C	- 21	11	▪▪▪▪▪
31	A		15	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	+ 20	18	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C		15	▪▪▪▪▪▪▪▪▪▪▪▪▪
32	A		15	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		16	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	- 13	13	▪▪▪▪▪▪▪▪▪
33	A		14	▪▪▪▪▪▪▪▪▪▪▪
	B	- 42	8	<
	C	- 42	8	<
34	A		15	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		14	▪▪▪▪▪▪▪▪▪▪▪
	C	- 46	8	<
35	A		16	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 12	14	▪▪▪▪▪▪▪▪▪▪▪
	C	- 18	13	▪▪▪▪▪▪▪▪▪
36	A		15	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 13	13	▪▪▪▪▪▪▪▪▪
	C	- 26	11	▪▪▪▪▪

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B25

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

AUTUMN MEAN WIND SPEEDS

SUGGESTED EFFECTIVE (MPH)
GUST SPEEDS FOR ------> <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
25	A		23	■■■■■■■■■■■■■■
	B	- 43	13	■■■■
	C	- 30	16	■■■■■■■
26	A		21	■■■■■■■■■■■■
	B	- 14	18	■■■■■■■■■
	C		19	■■■■■■■■■■
27	A		24	■■■■■■■■■■■■■■■
	B	- 20	19	■■■■■■■■■■
	C		24	■■■■■■■■■■■■■■■
28	A		23	■■■■■■■■■■■■■■
	B	- 13	20	■■■■■■■■■■■
	C		22	■■■■■■■■■■■■■
29	A		23	■■■■■■■■■■■■■■
	B		25	■■■■■■■■■■■■■■■■
	C		25	■■■■■■■■■■■■■■■■
30	A		21	■■■■■■■■■■■■
	B		19	■■■■■■■■■■
	C		20	■■■■■■■■■■■
31	A		23	■■■■■■■■■■■■■■
	B	+ 17	27	■■■■■■■■■■■■■■■■■■■
	C		25	■■■■■■■■■■■■■■■■
32	A		23	■■■■■■■■■■■■■■
	B	+ 13	26	■■■■■■■■■■■■■■■■■
	C		21	■■■■■■■■■■■■
33	A		22	■■■■■■■■■■■■■
	B	- 45	12	■■■
	C	- 45	12	■■■
34	A		23	■■■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■
	C	- 52	11	■■
35	A		23	■■■■■■■■■■■■■■
	B		22	■■■■■■■■■■■■■
	C	- 13	20	■■■■■■■■■■■
36	A		22	■■■■■■■■■■■■■
	B		22	■■■■■■■■■■■■■
	C	- 18	18	■■■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B26

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

AUTUMN EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 15 20 25 29+
37	A		16	■■■■■■■■■■■■■■■
	B	- 12	14	■■■■■■■■■■■
	C	- 50	8	<
38	A		16	■■■■■■■■■■■■■■■
	B		16	■■■■■■■■■■■■■■■
	C	- 50	8	<
39	A		14	■■■■■■■■■■■
	B		13	■■■■■■■■■
	C		13	■■■■■■■■■
40	A		14	■■■■■■■■■■■
	B		14	■■■■■■■■■■■
	C	- 35	9	■
41	A		13	■■■■■■■■■
	B		12	■■■■■■■
	C		12	■■■■■■■
42	A		15	■■■■■■■■■■■■■
	B	- 20	12	■■■■■■■
	C	- 13	13	■■■■■■■■■
43	A		16	■■■■■■■■■■■■■■■
	B	- 12	14	■■■■■■■■■■■
	C	- 31	11	■■■■■
44	A		16	■■■■■■■■■■■■■■■
	B	- 37	10	■■■
	C	- 56	7	<
45	A		15	■■■■■■■■■■■■■
	B	- 26	11	■■■■■
	C	- 13	13	■■■■■■■■■
46	A		17	■■■■■■■■■■■■■■■■■
	B	- 35	11	■■■■■
	C	- 29	12	■■■■■■■
47	A		16	■■■■■■■■■■■■■■■
	B	- 31	11	■■■■■
	C	- 56	7	<
48	A		17	■■■■■■■■■■■■■■■■■
	B	- 29	12	■■■■■■■
	C	- 35	11	■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B27

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

AUTUMN MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> (MPH) <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
37	A		23	■■■■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■■
	C	- 47	12	■■■
38	A		24	■■■■■■■■■■■■■■■■
	B		24	■■■■■■■■■■■■■■■■
	C	- 50	12	■■■
39	A		22	■■■■■■■■■■■■■
	B		20	■■■■■■■■■■■
	C		20	■■■■■■■■■■■
40	A		21	■■■■■■■■■■■■
	B		22	■■■■■■■■■■■■■
	C	- 33	14	■■■■■
41	A		21	■■■■■■■■■■■■
	B		19	■■■■■■■■■■
	C		19	■■■■■■■■■■
42	A		24	■■■■■■■■■■■■■■■■
	B	- 16	20	■■■■■■■■■■■
	C	- 16	20	■■■■■■■■■■■
43	A		24	■■■■■■■■■■■■■■■■
	B	- 12	21	■■■■■■■■■■■■
	C	- 25	18	■■■■■■■■■
44	A		23	■■■■■■■■■■■■■■■
	B	- 26	17	■■■■■■■■
	C	- 56	10	■
45	A		22	■■■■■■■■■■■■■
	B	- 22	17	■■■■■■■■
	C	- 13	19	■■■■■■■■■■
46	A		24	■■■■■■■■■■■■■■■■
	B	- 29	17	■■■■■■■■
	C	- 20	19	■■■■■■■■■■
47	A		23	■■■■■■■■■■■■■■■
	B	- 21	18	■■■■■■■■■
	C	- 56	10	■
48	A		24	■■■■■■■■■■■■■■■■
	B	- 20	19	■■■■■■■■■■
	C	- 25	18	■■■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B28

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

AUTUMN EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING | 15 STANDING | 19 WALKING | 27 UNCOMFORTABLE FOR WALKING | DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 :	15 :	20 :	25 :	29+ :
49	A		16	■■■■■■■■■■■■■■■				
	B	- 25	12	■■■■■■■				
	C	- 31	11	■■■■■				
50	A		17	■■■■■■■■■■■■■■■■■				
	B	- 11	15	■■■■■■■■■■■■■				
	C	- 29	12	■■■■■■■				
51	A		18	■■■■■■■■■■■■■■■■■■				
	B	- 11	16	■■■■■■■■■■■■■■■				
	C	- 11	16	■■■■■■■■■■■■■■■				

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B29

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

AUTUMN MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> (MPH) <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 :	20 :	30 :	40 :	50+ :
49	A		24	■■■■■■■■■■■■■■■				
	B	- 25	18	■■■■■■■■■				
	C	- 29	17	■■■■■■■■				
50	A		24	■■■■■■■■■■■■■■■				
	B		22	■■■■■■■■■■■■■				
	C	- 25	18	■■■■■■■■■				
51	A		28	■■■■■■■■■■■■■■■■■■				
	B		26	■■■■■■■■■■■■■■■■				
	C	- 10	25	■■■■■■■■■■■■■■■				

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B30

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

AUTUMN EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING | 15 STANDING | 19 WALKING | 27 UNCOMFORTABLE FOR WALKING | DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10	15	20	25	29+
1	A		11	■■■■■				
	B	+ 18	13	■■■■■■■■■				
	C	+ 18	13	■■■■■■■■■				
2	A		15	■■■■■■■■■■■■■				
	B	- 13	13	■■■■■■■■■				
	C		14	■■■■■■■■■■■				
3	A		15	■■■■■■■■■■■■■				
	B	+ 33	20	■■■■■■■■■■■■■■■■■■■■■■■				
	C	+ 40	21	■■■■■■■■■■■■■■■■■■■■■■■■■				
4	A		17	■■■■■■■■■■■■■■■■■				
	B	+ 17	20	■■■■■■■■■■■■■■■■■■■■■■■				
	C	+ 11	19	■■■■■■■■■■■■■■■■■■■■■				
5	A		17	■■■■■■■■■■■■■■■■■				
	B		18	■■■■■■■■■■■■■■■■■■■				
	C		18	■■■■■■■■■■■■■■■■■■■				
6	A		15	■■■■■■■■■■■■■				
	B		14	■■■■■■■■■■■				
	C		14	■■■■■■■■■■■				
7	A		12	■■■■■■■				
	B	+ 16	14	■■■■■■■■■■■				
	C		13	■■■■■■■■■				
8	A		13	■■■■■■■■■				
	B		12	■■■■■■■				
	C		13	■■■■■■■■■				
9	A		14	■■■■■■■■■■■				
	B		14	■■■■■■■■■■■				
	C		13	■■■■■■■■■				
10	A		13	■■■■■■■■■				
	B		12	■■■■■■■				
	C		12	■■■■■■■				
11	A		14	■■■■■■■■■■■				
	B	- 14	12	■■■■■■■				
	C	+ 14	16	■■■■■■■■■■■■■■■				
12	A		14	■■■■■■■■■■■				
	B		14	■■■■■■■■■■■				
	C	- 21	11	■■■■■				

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B31

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

WINTER MEAN WIND SPEEDS

SUGGESTED EFFECTIVE (MPH)
GUST SPEEDS FOR ------> <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
1	A		18	*********
	B	+ 11	20	**********
	C	+ 11	20	**********
2	A		21	**********
	B		20	**********
	C		20	**********
3	A		23	**********
	B	+ 39	32	**********
	C	+ 43	33	**********
4	A		25	**********
	B	+ 20	30	**********
	C	+ 20	30	**********
5	A		26	**********
	B	+ 11	29	**********
	C	+ 15	30	**********
6	A		23	**********
	B		23	**********
	C		24	**********
7	A		19	*********
	B	+ 26	24	**********
	C	+ 21	23	**********
8	A		20	**********
	B	- 10	18	*********
	C		19	**********
9	A		23	**********
	B		21	**********
	C	- 17	19	**********
10	A		21	**********
	B		19	**********
	C		20	**********
11	A		21	**********
	B	- 14	18	*********
	C	+ 14	24	**********
12	A		21	**********
	B		22	**********
	C	- 14	18	*********

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE 1 BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B32

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

WINTER EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING | 15 STANDING | 19 WALKING | 27 UNCOMFORTABLE FOR WALKING | DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 : 15 : 20 : 25 : 29+ :
13	A		15	■■■■■■■■■■■■■■
	B	- 13	13	■■■■■■■■■
	C	- 13	13	■■■■■■■■■
14	A		14	■■■■■■■■■■■
	B	+ 14	16	■■■■■■■■■■■■■■■■
	C	+ 14	16	■■■■■■■■■■■■■■■■
15	A		14	■■■■■■■■■■■
	B		15	■■■■■■■■■■■■■■
	C		14	■■■■■■■■■■■
16	A		15	■■■■■■■■■■■■■■
	B	- 40	9	■
	C	- 40	9	■
17	A		15	■■■■■■■■■■■■■■
	B	+ 26	19	■■■■■■■■■■■■■■■■■■■■■
	C	+ 33	20	■■■■■■■■■■■■■■■■■■■■■■
18	A		13	■■■■■■■■■
	B	+ 38	18	■■■■■■■■■■■■■■■■■■
	C	+ 46	19	■■■■■■■■■■■■■■■■■■■■■
19	A		12	■■■■■■■
	B	+ 25	15	■■■■■■■■■■■■■■
	C	+ 25	15	■■■■■■■■■■■■■■
20	A		15	■■■■■■■■■■■■■■
	B		14	■■■■■■■■■■■
	C		14	■■■■■■■■■■■
21	A		14	■■■■■■■■■■■
	B	- 14	12	■■■■■■■
	C	- 14	12	■■■■■■■
22	A		16	■■■■■■■■■■■■■■■■
	B	- 43	9	■
	C	- 43	9	■
23	A		15	■■■■■■■■■■■■■■
	B	- 13	13	■■■■■■■■■
	C	- 13	13	■■■■■■■■■
24	A		18	■■■■■■■■■■■■■■■■■■
	B	- 38	11	■■■■■
	C	- 38	11	■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B33

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

WINTER MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR (MPH) ------> <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
13	A		23	■■■■■■■■■■■■■■■
	B		21	■■■■■■■■■■■■
	C		21	■■■■■■■■■■■■
14	A		22	■■■■■■■■■■■■■
	B	+ 22	27	■■■■■■■■■■■■■■■■■
	C	+ 22	27	■■■■■■■■■■■■■■■■■
15	A		22	■■■■■■■■■■■■■
	B	+ 13	25	■■■■■■■■■■■■■■■
	C	+ 13	25	■■■■■■■■■■■■■■■
16	A		23	■■■■■■■■■■■■■■■
	B	- 34	15	■■■■■■
	C	- 34	15	■■■■■■
17	A		23	■■■■■■■■■■■■■■■
	B	+ 26	29	■■■■■■■■■■■■■■■■■■■
	C	+ 34	31	■■■■■■■■■■■■■■■■■■■■■
18	A		21	■■■■■■■■■■■■
	B	+ 38	29	■■■■■■■■■■■■■■■■■■■
	C	+ 42	30	■■■■■■■■■■■■■■■■■■■■
19	A		20	■■■■■■■■■■■
	B	+ 25	25	■■■■■■■■■■■■■■■
	C	+ 25	25	■■■■■■■■■■■■■■■
20	A		23	■■■■■■■■■■■■■■■
	B		21	■■■■■■■■■■■■
	C		22	■■■■■■■■■■■■■
21	A		23	■■■■■■■■■■■■■■■
	B	- 13	20	■■■■■■■■■■■
	C	- 17	19	■■■■■■■■■■
22	A		26	■■■■■■■■■■■■■■■■■
	B	- 42	15	■■■■■■
	C	- 42	15	■■■■■■
23	A		23	■■■■■■■■■■■■■■■
	B		22	■■■■■■■■■■■■■■
	C		22	■■■■■■■■■■■■■■
24	A		26	■■■■■■■■■■■■■■■■■
	B	- 42	15	■■■■■■
	C	- 38	16	■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A 2000 FUTURE NO-BUILD CONDITION
B 1993 PHASE I BUILD CONDITION
C 2000 FULL-BUILD CONDITION

TABLE WIND-B34

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

WINTER EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR -------> (MPH)

12 SITTING | 15 STANDING | 19 WALKING | 27 UNCOMFORTABLE FOR WALKING | DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 15 20 25 29+
25	A		16	■■■■■■■■■■■■■■■
	B	- 43	9	■
	C	- 37	10	■■■
26	A		14	■■■■■■■■■■■
	B	- 21	11	■■■■■
	C		13	■■■■■■■■■
27	A		17	■■■■■■■■■■■■■■■■■
	B	- 23	13	■■■■■■■■■
	C		16	■■■■■■■■■■■■■■■
28	A		17	■■■■■■■■■■■■■■■■■
	B	- 17	14	■■■■■■■■■■■
	C	- 11	15	■■■■■■■■■■■■■
29	A		15	■■■■■■■■■■■■■
	B	+ 20	18	■■■■■■■■■■■■■■■■■■
	C	+ 13	17	■■■■■■■■■■■■■■■■■
30	A		14	■■■■■■■■■■■
	B	- 14	12	■■■■■■■
	C	- 14	12	■■■■■■■
31	A		16	■■■■■■■■■■■■■■■
	B	+ 18	19	■■■■■■■■■■■■■■■■■■■■
	C		17	■■■■■■■■■■■■■■■■■
32	A		15	■■■■■■■■■■■■■
	B	+ 13	17	■■■■■■■■■■■■■■■■■
	C		14	■■■■■■■■■■■
33	A		15	■■■■■■■■■■■■■
	B	- 46	8	<
	C	- 40	9	■
34	A		15	■■■■■■■■■■■■■
	B		15	■■■■■■■■■■■■■
	C	- 40	9	■
35	A		16	■■■■■■■■■■■■■■■
	B	- 12	14	■■■■■■■■■■■
	C	- 12	14	■■■■■■■■■■■
36	A		15	■■■■■■■■■■■■■
	B	- 13	13	■■■■■■■■■
	C	- 20	12	■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B35

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

WINTER MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR (MPH) ------> <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
25	A		24	■■■■■■■■■■■■■■■
	B	- 45	13	■■■■
	C	- 29	17	■■■■■■■■
26	A		22	■■■■■■■■■■■■■
	B	- 18	18	■■■■■■■■■
	C		20	■■■■■■■■■■■
27	A		25	■■■■■■■■■■■■■■■■
	B	- 12	22	■■■■■■■■■■■■■
	C		24	■■■■■■■■■■■■■■■
28	A		25	■■■■■■■■■■■■■■■■
	B	- 16	21	■■■■■■■■■■■■
	C		23	■■■■■■■■■■■■■■
29	A		24	■■■■■■■■■■■■■■■
	B		26	■■■■■■■■■■■■■■■■■
	C		26	■■■■■■■■■■■■■■■■■
30	A		22	■■■■■■■■■■■■■
	B		21	■■■■■■■■■■■■
	C		23	■■■■■■■■■■■■■■
31	A		24	■■■■■■■■■■■■■■■
	B	+ 20	29	■■■■■■■■■■■■■■■■■■■■
	C	+ 12	27	■■■■■■■■■■■■■■■■■■
32	A		24	■■■■■■■■■■■■■■■
	B	+ 12	27	■■■■■■■■■■■■■■■■■■
	C		23	■■■■■■■■■■■■■■
33	A		22	■■■■■■■■■■■■■
	B	- 45	12	■■■
	C	- 36	14	■■■■■
34	A		24	■■■■■■■■■■■■■■■
	B		24	■■■■■■■■■■■■■■■
	C	- 50	12	■■■
35	A		24	■■■■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■
	C		22	■■■■■■■■■■■■■
36	A		23	■■■■■■■■■■■■■■
	B		22	■■■■■■■■■■■■■
	C	- 17	19	■■■■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B36

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

WINTER EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR -------> (MPH)

SITTING 12 | STANDING 15 | WALKING 19 | UNCOMFORTABLE FOR WALKING 27 | DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 : 15 : 20 : 25 : 29+ :
37	A		16	■■■■■■■■■■■■■■■
	B	- 12	14	■■■■■■■■■■■
	C	- 43	9	■
38	A		16	■■■■■■■■■■■■■■■
	B		17	■■■■■■■■■■■■■■■■■
	C	- 43	9	■
39	A		14	■■■■■■■■■■■
	B		13	■■■■■■■■■
	C		15	■■■■■■■■■■■■■
40	A		15	■■■■■■■■■■■■■
	B		14	■■■■■■■■■■■
	C	- 33	10	■■■
41	A		14	■■■■■■■■■■■
	B		13	■■■■■■■■■
	C		13	■■■■■■■■■
42	A		16	■■■■■■■■■■■■■■■
	B	- 18	13	■■■■■■■■■
	C	- 12	14	■■■■■■■■■■■
43	A		17	■■■■■■■■■■■■■■■■■
	B	- 11	15	■■■■■■■■■■■■■
	C	- 35	11	■■■■■
44	A		16	■■■■■■■■■■■■■■■
	B	- 31	11	■■■■■
	C	- 50	8	<
45	A		15	■■■■■■■■■■■■■
	B	- 26	11	■■■■■
	C	- 13	13	■■■■■■■■■
46	A		17	■■■■■■■■■■■■■■■■■
	B	- 29	12	■■■■■■■
	C	- 29	12	■■■■■■■
47	A		17	■■■■■■■■■■■■■■■■■
	B	- 29	12	■■■■■■■
	C	- 52	8	<
48	A		17	■■■■■■■■■■■■■■■■■
	B	- 23	13	■■■■■■■■■
	C	- 29	12	■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B37

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

WINTER MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR (MPH) ------> <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
37	A		24	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		23	▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	- 41	14	▪▪▪▪▪
38	A		25	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		25	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	- 48	13	▪▪▪▪
39	A		22	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		21	▪▪▪▪▪▪▪▪▪▪▪▪
	C		23	▪▪▪▪▪▪▪▪▪▪▪▪▪▪
40	A		22	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		23	▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	- 31	15	▪▪▪▪▪▪
41	A		22	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		21	▪▪▪▪▪▪▪▪▪▪▪▪
	C	- 13	19	▪▪▪▪▪▪▪▪▪▪
42	A		25	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 16	21	▪▪▪▪▪▪▪▪▪▪▪▪
	C	- 20	20	▪▪▪▪▪▪▪▪▪▪▪
43	A		25	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		23	▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	- 24	19	▪▪▪▪▪▪▪▪▪▪
44	A		24	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 25	18	▪▪▪▪▪▪▪▪▪
	C	- 54	11	▪▪
45	A		23	▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 26	17	▪▪▪▪▪▪▪▪
	C	- 17	19	▪▪▪▪▪▪▪▪▪▪
46	A		25	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 28	18	▪▪▪▪▪▪▪▪▪
	C	- 20	20	▪▪▪▪▪▪▪▪▪▪▪
47	A		24	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 12	21	▪▪▪▪▪▪▪▪▪▪▪▪
	C	- 54	11	▪▪
48	A		25	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 16	21	▪▪▪▪▪▪▪▪▪▪▪▪
	C	- 28	18	▪▪▪▪▪▪▪▪▪

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B38

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

WINTER EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ———> (MPH)

12 SITTING · 15 STANDING · 19 WALKING · 27 UNCOMFORTABLE FOR WALKING · DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)
49	A		17
	B	- 29	12
	C	- 35	11
50	A		17
	B	- 11	15
	C	- 29	12
51	A		20
	B	- 10	18
	C	- 10	18

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A 2000 FUTURE NO-BUILD CONDITION
B 1993 PHASE I BUILD CONDITION
C 2000 FULL-BUILD CONDITION

TABLE WIND-B39

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

WINTER MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ———> (MPH)

<------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
49	A		25	■■■■■■■■■■■■■■■■
	B	- 24	19	■■■■■■■■■■
	C	- 28	18	■■■■■■■■■
50	A		25	■■■■■■■■■■■■■■■■
	B	- 12	22	■■■■■■■■■■■■■
	C	- 24	19	■■■■■■■■■■
51	A		31	■■■■■■■■■■■■■■■■■■■■■■
	B		28	■■■■■■■■■■■■■■■■■■■
	C		28	■■■■■■■■■■■■■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B40

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

WINTER EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR -------> (MPH)

12 SITTING | 15 STANDING | 19 WALKING | 27 UNCOMFORTABLE FOR WALKING | DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 : 15 : 20 : 25 : 29+ :
1	A		11	■■■■■
	B		12	■■■■■■■
	C		12	■■■■■■■
2	A		14	■■■■■■■■■■■
	B	- 14	12	■■■■■■■
	C		13	■■■■■■■■■
3	A		14	■■■■■■■■■■■
	B	+ 35	19	■■■■■■■■■■■■■■■■■■■■■
	C	+ 35	19	■■■■■■■■■■■■■■■■■■■■■
4	A		17	■■■■■■■■■■■■■■■■■
	B	+ 11	19	■■■■■■■■■■■■■■■■■■■■■
	C		18	■■■■■■■■■■■■■■■■■■
5	A		16	■■■■■■■■■■■■■■■
	B		16	■■■■■■■■■■■■■■■
	C		17	■■■■■■■■■■■■■■■■■
6	A		14	■■■■■■■■■■■
	B		13	■■■■■■■■■
	C		13	■■■■■■■■■
7	A		12	■■■■■■■
	B	+ 16	14	■■■■■■■■■■■
	C		12	■■■■■■■
8	A		13	■■■■■■■■■
	B	- 15	11	■■■■■
	C		13	■■■■■■■■■
9	A		14	■■■■■■■■■■■
	B		14	■■■■■■■■■■■
	C	- 14	12	■■■■■■■
10	A		13	■■■■■■■■■
	B	- 15	11	■■■■■
	C	- 15	11	■■■■■
11	A		14	■■■■■■■■■■■
	B	- 21	11	■■■■■
	C		14	■■■■■■■■■■■
12	A		14	■■■■■■■■■■■
	B		13	■■■■■■■■■
	C	- 28	10	■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B41

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

ANNUAL MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR (MPH) -----> <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
1	A		17	■■■■■■■■
	B		18	■■■■■■■■■
	C	+ 11	19	■■■■■■■■■■
2	A		20	■■■■■■■■■■■
	B	- 10	18	■■■■■■■■■
	C		19	■■■■■■■■■■
3	A		21	■■■■■■■■■■■■
	B	+ 38	29	■■■■■■■■■■■■■■■■■■■■
	C	+ 42	30	■■■■■■■■■■■■■■■■■■■■■■
4	A		24	■■■■■■■■■■■■■■■
	B	+ 16	28	■■■■■■■■■■■■■■■■■■■■
	C	+ 16	28	■■■■■■■■■■■■■■■■■■■■
5	A		25	■■■■■■■■■■■■■■■■
	B		27	■■■■■■■■■■■■■■■■■■■
	C	+ 12	28	■■■■■■■■■■■■■■■■■■■■
6	A		22	■■■■■■■■■■■■■
	B		21	■■■■■■■■■■■■
	C		22	■■■■■■■■■■■■■
7	A		19	■■■■■■■■■■
	B	+ 15	22	■■■■■■■■■■■■■
	C	+ 10	21	■■■■■■■■■■■■
8	A		20	■■■■■■■■■■■
	B	- 15	17	■■■■■■■■
	C	- 10	18	■■■■■■■■■
9	A		22	■■■■■■■■■■■■■
	B		21	■■■■■■■■■■■■
	C	- 13	19	■■■■■■■■■■
10	A		20	■■■■■■■■■■■
	B	- 10	18	■■■■■■■■■
	C	- 10	18	■■■■■■■■■
11	A		20	■■■■■■■■■■■
	B	- 15	17	■■■■■■■■
	C	+ 10	22	■■■■■■■■■■■■■
12	A		21	■■■■■■■■■■■■
	B		20	■■■■■■■■■■■
	C	- 23	16	■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A 2000 FUTURE NO-BUILD CONDITION
B 1993 PHASE I BUILD CONDITION
C 2000 FULL-BUILD CONDITION

TABLE WIND-B42

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

ANNUAL EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 15 20 25 29+
13	A		14	**********
	B	- 14	12	*******
	C	- 14	12	*******
14	A		14	**********
	B		15	**********
	C		15	**********
15	A		13	*********
	B		13	*********
	C		13	*********
16	A		15	**********
	B	- 46	8	<
	C	- 46	8	<
17	A		14	**********
	B	+ 28	18	**********
	C	+ 35	19	**********
18	A		13	*********
	B	+ 30	17	**********
	C	+ 38	18	**********
19	A		12	*******
	B	+ 16	14	**********
	C	+ 16	14	**********
20	A		14	**********
	B		13	*********
	C		13	*********
21	A		14	**********
	B	- 21	11	*****
	C	- 21	11	*****
22	A		15	**********
	B	- 40	9	*
	C	- 40	9	*
23	A		15	**********
	B	- 20	12	*******
	C	- 20	12	*******
24	A		18	**********
	B	- 44	10	***
	C	- 38	11	*****

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B43

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

ANNUAL MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR (MPH) ------> <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
13	A		22	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 13	19	▪▪▪▪▪▪▪▪▪▪
	C	- 13	19	▪▪▪▪▪▪▪▪▪▪
14	A		21	▪▪▪▪▪▪▪▪▪▪▪▪
	B	+ 14	24	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	+ 19	25	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
15	A		20	▪▪▪▪▪▪▪▪▪▪▪
	B	+ 15	23	▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	+ 10	22	▪▪▪▪▪▪▪▪▪▪▪▪▪
16	A		23	▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 43	13	▪▪▪▪
	C	- 39	14	▪▪▪▪▪
17	A		22	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	+ 22	27	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	+ 31	29	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
18	A		20	▪▪▪▪▪▪▪▪▪▪▪
	B	+ 35	27	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	+ 40	28	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
19	A		19	▪▪▪▪▪▪▪▪▪▪
	B	+ 15	22	▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	+ 15	22	▪▪▪▪▪▪▪▪▪▪▪▪▪
20	A		21	▪▪▪▪▪▪▪▪▪▪▪▪
	B		20	▪▪▪▪▪▪▪▪▪▪▪
	C		20	▪▪▪▪▪▪▪▪▪▪▪
21	A		21	▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 14	18	▪▪▪▪▪▪▪▪▪
	C	- 14	18	▪▪▪▪▪▪▪▪▪
22	A		25	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 44	14	▪▪▪▪▪
	C	- 44	14	▪▪▪▪▪
23	A		22	▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		20	▪▪▪▪▪▪▪▪▪▪▪
	C		21	▪▪▪▪▪▪▪▪▪▪▪▪
24	A		25	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 40	15	▪▪▪▪▪▪
	C	- 36	16	▪▪▪▪▪▪▪

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B44

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

ANNUAL EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

SITTING 12 STANDING 15 WALKING 19 UNCOMFORTABLE FOR WALKING 27 DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 15 20 25 29+
25	A		16	■■■■■■■■■■■■■■■
	B	- 50	8	<
	C	- 37	10	■■■
26	A		14	■■■■■■■■■■■
	B	- 21	11	■■■■■
	C	- 14	12	■■■■■■■
27	A		17	■■■■■■■■■■■■■■■■■
	B	- 29	12	■■■■■■■
	C	- 11	15	■■■■■■■■■■■■■
28	A		16	■■■■■■■■■■■■■■■
	B	- 18	13	■■■■■■■■■
	C		15	■■■■■■■■■■■■■
29	A		15	■■■■■■■■■■■■■
	B	+ 20	18	■■■■■■■■■■■■■■■■■■■
	C	+ 13	17	■■■■■■■■■■■■■■■■■
30	A		14	■■■■■■■■■■■
	B	- 21	11	■■■■■
	C	- 21	11	■■■■■
31	A		15	■■■■■■■■■■■■■
	B	+ 20	18	■■■■■■■■■■■■■■■■■■■
	C		16	■■■■■■■■■■■■■■■
32	A		15	■■■■■■■■■■■■■
	B		16	■■■■■■■■■■■■■■■
	C	- 13	13	■■■■■■■■■
33	A		14	■■■■■■■■■■■
	B	- 42	8	<
	C	- 35	9	■
34	A		15	■■■■■■■■■■■■■
	B		14	■■■■■■■■■■■
	C	- 46	8	<
35	A		16	■■■■■■■■■■■■■■■
	B	- 12	14	■■■■■■■■■■■
	C	- 18	13	■■■■■■■■■
36	A		15	■■■■■■■■■■■■■
	B	- 13	13	■■■■■■■■■
	C	- 26	11	■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B45

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

ANNUAL MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> (MPH) <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30! : 40 : 50+ :
25	A		23	■■■■■■■■■■■■■■■
	B	- 43	13	■■■■
	C	- 26	17	■■■■■■■■■
26	A		21	■■■■■■■■■■■■
	B	- 14	18	■■■■■■■■■
	C		20	■■■■■■■■■■■
27	A		24	■■■■■■■■■■■■■■■■
	B	- 16	20	■■■■■■■■■■■
	C		24	■■■■■■■■■■■■■■■■
28	A		24	■■■■■■■■■■■■■■■■
	B	- 16	20	■■■■■■■■■■■
	C		22	■■■■■■■■■■■■■
29	A		23	■■■■■■■■■■■■■■■
	B		25	■■■■■■■■■■■■■■■■■
	C		25	■■■■■■■■■■■■■■■■■
30	A		22	■■■■■■■■■■■■■
	B		20	■■■■■■■■■■■
	C		21	■■■■■■■■■■■■
31	A		23	■■■■■■■■■■■■■■■
	B	+ 21	28	■■■■■■■■■■■■■■■■■■■■
	C	+ 13	26	■■■■■■■■■■■■■■■■■■
32	A		23	■■■■■■■■■■■■■■■
	B	+ 13	26	■■■■■■■■■■■■■■■■■■
	C		22	■■■■■■■■■■■■■
33	A		22	■■■■■■■■■■■■■
	B	- 45	12	■■■
	C	- 40	13	■■■■
34	A		23	■■■■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■■
	C	- 47	12	■■■
35	A		23	■■■■■■■■■■■■■■■
	B		22	■■■■■■■■■■■■■
	C		21	■■■■■■■■■■■■
36	A		22	■■■■■■■■■■■■■
	B		22	■■■■■■■■■■■■■
	C	- 18	18	■■■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B46

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

ANNUAL EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)	10 : 15 : 20 : 25 : 29+ :
37	A		15	■■■■■■■■■■■■■■
	B		14	■■■■■■■■■■■■
	C	- 40	9	■
38	A		16	■■■■■■■■■■■■■■■■
	B		16	■■■■■■■■■■■■■■■■
	C	- 50	8	<
39	A		14	■■■■■■■■■■■■■
	B		13	■■■■■■■■■■
	C		13	■■■■■■■■■■
40	A		14	■■■■■■■■■■■■■
	B		14	■■■■■■■■■■■■■
	C	- 35	9	■
41	A		14	■■■■■■■■■■■■■
	B	- 14	12	■■■■■■■■
	C	- 14	12	■■■■■■■■
42	A		15	■■■■■■■■■■■■■■
	B	- 20	12	■■■■■■■■
	C		14	■■■■■■■■■■■■■
43	A		16	■■■■■■■■■■■■■■■■
	B	- 12	14	■■■■■■■■■■■■■
	C	- 31	11	■■■■■■
44	A		16	■■■■■■■■■■■■■■■■
	B	- 37	10	■■■■
	C	- 56	7	<
45	A		15	■■■■■■■■■■■■■■
	B	- 26	11	■■■■■■■
	C	- 13	13	■■■■■■■■■■
46	A		17	■■■■■■■■■■■■■■■■■■
	B	- 35	11	■■■■■■■
	C	- 29	12	■■■■■■■■
47	A		16	■■■■■■■■■■■■■■■■
	B	- 31	11	■■■■■■■
	C	- 56	7	<
48	A		17	■■■■■■■■■■■■■■■■■■
	B	- 29	12	■■■■■■■■
	C	- 35	11	■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B47

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

ANNUAL MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR (MPH) ------> <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30 : 40 : 50+ :
37	A		23	■■■■■■■■■■■■■■
	B		23	■■■■■■■■■■■■■■
	C	- 43	13	■■■■
38	A		24	■■■■■■■■■■■■■■■
	B		24	■■■■■■■■■■■■■■■
	C	- 50	12	■■■
39	A		22	■■■■■■■■■■■■■
	B		21	■■■■■■■■■■■■
	C		21	■■■■■■■■■■■■
40	A		22	■■■■■■■■■■■■■
	B		22	■■■■■■■■■■■■■
	C	- 36	14	■■■■■
41	A		21	■■■■■■■■■■■■
	B		20	■■■■■■■■■■■
	C		19	■■■■■■■■■■
42	A		24	■■■■■■■■■■■■■■■
	B	- 16	20	■■■■■■■■■■■
	C	- 16	20	■■■■■■■■■■■
43	A		24	■■■■■■■■■■■■■■■
	B	- 12	21	■■■■■■■■■■■■
	C	- 25	18	■■■■■■■■■
44	A		23	■■■■■■■■■■■■■■
	B	- 26	17	■■■■■■■■
	C	- 56	10	■
45	A		22	■■■■■■■■■■■■■
	B	- 22	17	■■■■■■■■
	C	- 13	19	■■■■■■■■■■
46	A		24	■■■■■■■■■■■■■■■
	B	- 29	17	■■■■■■■■
	C	- 20	19	■■■■■■■■■■
47	A		24	■■■■■■■■■■■■■■■
	B	- 20	19	■■■■■■■■■■
	C	- 58	10	■
48	A		24	■■■■■■■■■■■■■■■
	B	- 16	20	■■■■■■■■■■■
	C	- 25	18	■■■■■■■■■

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B48

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

ANNUAL EFFECTIVE GUST SPEEDS

SUGGESTED MEAN WIND SPEEDS FOR ------> (MPH)

12 SITTING, 15 STANDING, 19 WALKING, 27 UNCOMFORTABLE FOR WALKING, DANGEROUS CONDITIONS

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	MEAN SPEED (MPH)
49	A		16
	B	- 25	12
	C	- 31	11
50	A		17
	B	- 11	15
	C	- 29	12
51	A		19
	B	- 10	17
	C	- 15	16

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B49

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

ANNUAL MEAN WIND SPEEDS

SUGGESTED EFFECTIVE GUST SPEEDS FOR ------> (MPH) <------ ACCEPTABLE ------> <------ UNACCEPTABLE ------>

LOCATION	TEST CONDITION	PERCENTAGE CHANGE	GUST SPEED (MPH)	10 : 20 : 30! : 40 : 50+ :
49	A		24	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 25	18	▪▪▪▪▪▪▪▪▪
	C	- 29	17	▪▪▪▪▪▪▪▪
50	A		24	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B		22	▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	- 25	18	▪▪▪▪▪▪▪▪▪
51	A		29	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	B	- 10	26	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪
	C	- 10	26	▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪▪

NOTE: 1) Final asterisk denotes category of pedestrian activity for which the predicted winds are suitable.
2) % Change greater than 10% based on comparison with Test Condition A.
3) Wind speeds are for a 1% probability.

TEST CONDITION

A	2000 FUTURE NO-BUILD CONDITION
B	1993 PHASE I BUILD CONDITION
C	2000 FULL-BUILD CONDITION

TABLE WIND-B50

ANTICIPATED LEVELS OF PEDESTRIAN WIND COMFORT

ANNUAL EFFECTIVE GUST SPEEDS

Section 3

PEDESTRIAN LEVEL WIND TEST DATA

The wind speed ratios presented in this Appendix are a ratio of the wind speed at a sensor location (5 feet above the ground) to the mean wind speed which occurs at gradient height. To understand this, consider the wind speed ratio presented for Location 1 (2000 Future No-Build Condition) on Table C-1 pertaining to the study site. The conditions at Location 1 indicate that a mean wind speed ratio of 0.20 occurs for a northeast wind direction. This ratio indicates that, for a northeast wind direction, the 5 foot level wind speed would be 0.20 times or 20% of the wind speed at gradient height. Hence a 100 mph gradient wind speed would be reduced to 20 mph at Location 1 for a northeast wind direction.

The last two columns of values for each location present a weighting factor for the spring (SPR), summer (SUM), autumn (FAL) and for the winter (WINT). These factors are a measure of how each wind direction affects the overall comfort level at each location. The weighting factor is derived from an analysis of the wind tunnel test data (peak gust wind speed ratios) and the wind records obtained from the local weather station. As a result of this analysis, the weighting factor is dependent upon each of the following:

i) the peak gust wind speed ratio measured at the sensor
ii) the frequency of occurrence of the wind direction being examined
iii) the strength of the wind for the same wind direction examined

The weighting factors are expressed as a percentage. For instance, the spring weighting factor for our example, Location 1 and a south direction, is 10%. This indicates that 10% of the time when the monthly peak gust wind speed is exceeded at Location 1, the wind will occur from this direction. The weighting factors allow one to look at each sensor and immediately determine which wind direction(s) has the greatest impact on the resultant wind comfort level. For example, the most important wind directions for Location 1 during the spring are NNE, NE and E. Since the weighting factors are based on a meteorological data analysis, they will vary from season to season for a given test location and direction. This is evident in our location as the south wind direction during the spring has a weighting factor of 10% and during the summer the weighting factor is 13%.

2000 FUTURE NO-BUILD CONDITION

LOCATION 1

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.27	.66	21	20
NE	.20	.53	17	14
ENE	.19	.49	10	3
E	.21	.62	17	8
ESE	.20	.58	3	2
SE	.34	.82	9	17
SSE	.25	.73	4	6
S	.20	.64	10	13
SSW	.15	.42	0	1
SW	.14	.34	0	0
WSW	.17	.45	2	6
W	.15	.34	0	0
WNW	.14	.32	0	0
NW	.14	.33	0	0
NNW	.16	.38	0	0
N	.21	.58	6	7

LOCATION 2

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.29	.59	11	11
NE	.22	.46	5	6
ENE	.30	.53	17	5
E	.36	.58	11	5
ESE	.37	.63	8	5
SE	.33	.69	2	3
SSE	.30	.75	4	7
S	.24	.66	12	16
SSW	.23	.52	1	7
SW	.21	.43	0	8
WSW	.19	.42	1	3
W	.18	.37	1	0
WNW	.19	.42	12	8
NW	.18	.40	2	2
NNW	.19	.43	1	2
N	.26	.62	10	10

LOCATION 3

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.18	.47	0	1
NE	.24	.59	15	15
ENE	.30	.65	29	14
E	.30	.55	3	3
ESE	.30	.55	0	0
SE	.26	.57	0	0
SSE	.28	.55	0	1
S	.20	.49	0	0
SSW	.20	.51	0	4
SW	.17	.44	0	4
WSW	.18	.48	1	5
W	.17	.47	3	3
WNW	.17	.39	1	2
NW	.16	.36	0	0
NNW	.17	.48	1	2
N	.36	.87	44	45

1993 PHASE I BUILD CONDITION

LOCATION 1

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.27	.60	17	14
NE	.16	.44	6	6
ENE	.16	.45	8	1
E	.20	.40	1	0
ESE	.23	.55	3	1
SE	.35	.79	9	15
SSE	.32	.79	8	9
S	.23	.58	7	6
SSW	.19	.47	0	3
SW	.17	.40	0	5
WSW	.18	.47	4	10
W	.14	.32	0	0
WNW	.14	.30	0	0
NW	.21	.44	10	6
NNW	.24	.51	9	10
N	.24	.61	14	11

LOCATION 2

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.23	.52	8	6
NE	.18	.41	4	4
ENE	.18	.39	3	0
E	.22	.39	1	0
ESE	.22	.47	1	0
SE	.27	.53	0	0
SSE	.26	.57	1	2
S	.24	.58	9	6
SSW	.23	.50	2	7
SW	.23	.52	10	33
WSW	.20	.45	3	7
W	.19	.39	3	1
WNW	.17	.38	9	3
NW	.21	.43	9	4
NNW	.26	.55	23	17
N	.25	.59	14	9

LOCATION 3

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.18	.50	0	0
NE	.21	.46	0	1
ENE	.28	.63	3	1
E	.20	.49	0	0
ESE	.26	.65	0	0
SE	.29	.66	0	0
SSE	.28	.62	0	0
S	.22	.60	0	0
SSW	.21	.51	0	0
SW	.18	.46	0	0
WSW	.18	.45	0	0
W	.21	.56	1	1
WNW	.26	.64	17	15
NW	.34	.79	41	35
NNW	.44	.93	38	45
N	.25	.71	1	2

2000 FULL-BUILD CONDITION

LOCATION 1

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.27	.65	23	18
NE	.15	.42	3	4
ENE	.17	.44	6	1
E	.18	.43	1	1
ESE	.22	.53	1	0
SE	.37	.85	12	20
SSE	.32	.79	7	8
S	.23	.62	10	9
SSW	.20	.47	0	3
SW	.18	.41	0	4
WSW	.18	.45	2	5
W	.14	.33	0	0
WNW	.14	.32	1	0
NW	.22	.46	11	7
NNW	.24	.54	13	12
N	.24	.60	9	7

LOCATION 2

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.25	.55	8	6
NE	.19	.39	2	2
ENE	.20	.44	6	1
E	.21	.41	1	0
ESE	.26	.52	2	0
SE	.28	.53	0	0
SSE	.26	.57	1	2
S	.24	.57	6	4
SSW	.24	.53	2	8
SW	.24	.53	9	33
WSW	.20	.45	2	5
W	.19	.38	2	0
WNW	.18	.37	5	2
NW	.21	.47	16	8
NNW	.26	.58	28	21
N	.24	.58	9	6

LOCATION 3

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.18	.46	0	0
NE	.18	.38	0	0
ENE	.24	.50	0	0
E	.20	.52	0	0
ESE	.22	.57	0	0
SE	.19	.45	0	0
SSE	.22	.51	0	0
S	.25	.61	0	0
SSW	.21	.52	0	0
SW	.24	.61	0	6
WSW	.18	.43	0	0
W	.21	.57	1	1
WNW	.26	.65	14	13
NW	.37	.85	58	46
NNW	.43	.90	26	34
N	.23	.69	0	1

TABLE C-1

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 4

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.61	2	3
NE	.31	.71	23	16
ENE	.37	.74	32	12
E	.44	.77	16	7
ESE	.34	.68	1	0
SE	.23	.61	0	0
SSE	.25	.70	0	1
S	.31	.71	4	4
SSW	.35	.73	5	18
SW	.29	.63	2	21
WSW	.27	.62	4	11
W	.23	.58	9	5
WNW	.16	.37	0	0
NW	.17	.42	0	0
NNW	.16	.38	0	0
N	.20	.53	0	0

LOCATION 5

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.29	.66	4	4
NE	.34	.70	20	12
ENE	.32	.74	31	8
E	.21	.62	3	1
ESE	.21	.67	1	0
SE	.25	.64	0	0
SSE	.37	.70	0	1
S	.37	.71	4	2
SSW	.36	.81	12	26
SW	.28	.71	10	34
WSW	.19	.57	1	3
W	.17	.51	2	0
WNW	.17	.41	0	0
NW	.21	.48	1	0
NNW	.28	.65	6	5
N	.32	.68	3	2

LOCATION 6

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.25	.63	7	5
NE	.30	.69	34	17
ENE	.21	.53	8	1
E	.22	.54	2	1
ESE	.26	.62	2	0
SE	.25	.71	1	0
SSE	.20	.54	0	0
S	.20	.56	1	0
SSW	.30	.74	15	28
SW	.24	.64	10	33
WSW	.16	.40	0	0
W	.15	.35	0	0
WNW	.16	.41	2	1
NW	.19	.47	2	1
NNW	.27	.61	10	8
N	.32	.63	4	3

1993 PHASE I BUILD CONDITION

LOCATION 4

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.21	.53	0	0
NE	.29	.63	3	5
ENE	.42	.84	27	13
E	.42	.77	6	4
ESE	.32	.67	0	0
SE	.22	.45	0	0
SSE	.26	.52	0	0
S	.30	.58	0	0
SSW	.32	.65	0	2
SW	.29	.62	0	8
WSW	.28	.62	1	5
W	.26	.59	2	2
WNW	.26	.69	29	23
NW	.31	.75	26	24
NNW	.36	.75	7	13
N	.24	.59	0	0

LOCATION 5

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.28	.62	0	1
NE	.31	.66	5	7
ENE	.30	.79	20	9
E	.31	.79	7	5
ESE	.24	.63	0	0
SE	.20	.57	0	0
SSE	.26	.63	0	0
S	.24	.58	0	0
SSW	.26	.67	0	3
SW	.27	.63	0	11
WSW	.22	.58	0	3
W	.27	.64	6	5
WNW	.27	.69	31	24
NW	.28	.75	29	26
NNW	.26	.66	1	4
N	.31	.64	0	1

LOCATION 6

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.51	0	1
NE	.21	.60	11	10
ENE	.21	.63	16	5
E	.20	.56	2	1
ESE	.23	.57	0	0
SE	.22	.62	0	0
SSE	.31	.78	1	3
S	.31	.75	8	10
SSW	.23	.60	1	6
SW	.22	.56	1	14
WSW	.19	.48	0	2
W	.22	.56	9	6
WNW	.21	.57	31	20
NW	.21	.58	15	12
NNW	.22	.60	4	7
N	.20	.49	0	0

2000 FULL-BUILD CONDITION

LOCATION 4

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.22	.54	0	0
NE	.27	.55	1	3
ENE	.38	.81	24	12
E	.35	.74	5	3
ESE	.28	.62	0	0
SE	.18	.39	0	0
SSE	.22	.45	0	0
S	.28	.54	0	0
SSW	.31	.63	0	2
SW	.29	.60	0	7
WSW	.27	.64	1	7
W	.25	.60	3	2
WNW	.25	.66	23	19
NW	.34	.78	39	34
NNW	.34	.73	5	11
N	.23	.57	0	0

LOCATION 5

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.27	.62	0	1
NE	.32	.68	5	8
ENE	.34	.79	17	8
E	.28	.69	2	2
ESE	.23	.64	0	0
SE	.16	.37	0	0
SSE	.21	.53	0	0
S	.25	.64	0	0
SSW	.24	.65	0	2
SW	.24	.60	0	6
WSW	.22	.59	0	3
W	.28	.64	4	4
WNW	.25	.67	20	19
NW	.30	.83	52	45
NNW	.26	.62	0	2
N	.29	.63	0	0

LOCATION 6

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.53	0	1
NE	.24	.65	12	13
ENE	.28	.64	12	5
E	.20	.53	1	1
ESE	.18	.45	0	0
SE	.17	.42	0	0
SSE	.23	.58	0	1
S	.32	.78	7	11
SSW	.22	.58	0	3
SW	.20	.52	0	6
WSW	.18	.47	0	1
W	.22	.56	5	5
WNW	.21	.55	14	13
NW	.23	.70	48	39
NNW	.19	.49	0	1
N	.19	.47	0	0

TABLE C-2

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 7

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.57	6	6
NE	.25	.66	38	22
ENE	.22	.57	19	5
E	.16	.42	0	0
ESE	.17	.47	0	0
SE	.25	.57	0	0
SSE	.31	.61	0	2
S	.28	.58	3	3
SSW	.29	.63	6	21
SW	.20	.55	4	26
WSW	.15	.39	0	1
W	.14	.39	0	0
WNW	.15	.47	20	11
NW	.17	.44	3	2
NNW	.14	.36	0	0
N	.17	.52	1	1

LOCATION 8

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.15	.35	0	0
NE	.20	.46	5	5
ENE	.29	.58	27	7
E	.28	.62	16	6
ESE	.26	.63	7	3
SE	.22	.65	1	1
SSE	.31	.65	2	3
S	.33	.59	5	4
SSW	.33	.66	15	32
SW	.24	.54	6	28
WSW	.18	.46	2	5
W	.17	.48	12	5
WNW	.15	.36	2	1
NW	.15	.31	0	0
NNW	.16	.34	0	0
N	.15	.31	0	0

LOCATION 9

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.17	.43	0	0
NE	.20	.54	6	7
ENE	.34	.67	28	11
E	.35	.69	13	6
ESE	.37	.75	9	6
SE	.37	.88	5	8
SSE	.24	.75	2	3
S	.21	.60	2	2
SSW	.23	.57	0	4
SW	.20	.55	1	15
WSW	.20	.59	5	15
W	.16	.46	1	1
WNW	.19	.53	24	15
NW	.18	.43	0	1
NNW	.23	.55	3	5
N	.17	.40	0	0

1993 PHASE I BUILD CONDITION

LOCATION 7

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.49	0	1
NE	.27	.70	27	24
ENE	.34	.73	35	22
E	.21	.54	1	1
ESE	.19	.45	0	0
SE	.20	.48	0	0
SSE	.22	.60	0	1
S	.18	.47	0	0
SSW	.18	.45	0	0
SW	.17	.43	0	2
WSW	.17	.44	0	1
W	.21	.54	6	7
WNW	.18	.51	12	14
NW	.22	.59	17	21
NNW	.20	.52	1	3
N	.21	.50	0	0

LOCATION 8

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.14	.31	0	0
NE	.19	.44	8	10
ENE	.26	.51	24	11
E	.24	.54	14	8
ESE	.24	.55	5	5
SE	.23	.60	2	3
SSE	.23	.53	1	3
S	.18	.41	1	0
SSW	.16	.35	0	0
SW	.15	.35	0	4
WSW	.17	.44	3	14
W	.19	.46	21	20
WNW	.17	.40	21	17
NW	.15	.34	0	1
NNW	.15	.31	0	0
N	.14	.28	0	0

LOCATION 9

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.41	0	0
NE	.18	.48	4	6
ENE	.30	.55	14	5
E	.34	.65	14	7
ESE	.37	.76	17	15
SE	.35	.76	3	5
SSE	.29	.75	2	5
S	.21	.62	5	5
SSW	.16	.44	0	1
SW	.15	.43	0	4
WSW	.20	.58	8	23
W	.16	.41	1	1
WNW	.18	.50	27	18
NW	.20	.42	1	1
NNW	.23	.52	3	6
N	.16	.38	0	0

2000 FULL-BUILD CONDITION

LOCATION 7

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.48	0	1
NE	.20	.50	2	5
ENE	.17	.41	0	0
E	.16	.36	0	0
ESE	.18	.45	0	0
SE	.19	.46	0	0
SSE	.14	.30	0	0
S	.15	.36	0	0
SSW	.17	.41	0	0
SW	.16	.45	0	4
WSW	.17	.44	0	2
W	.22	.53	5	6
WNW	.19	.55	26	24
NW	.23	.69	66	56
NNW	.17	.47	0	1
N	.21	.52	0	1

LOCATION 8

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.23	.50	5	7
NE	.29	.53	22	18
ENE	.26	.47	11	4
E	.27	.50	6	4
ESE	.29	.49	1	0
SE	.23	.44	0	0
SSE	.20	.42	0	0
S	.15	.34	0	0
SSW	.16	.36	0	0
SW	.17	.42	0	12
WSW	.16	.40	1	5
W	.20	.45	12	11
WNW	.19	.46	38	28
NW	.17	.41	5	6
NNW	.17	.37	0	1
N	.16	.33	0	0

LOCATION 9

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.47	1	2
NE	.27	.57	24	17
ENE	.29	.55	21	8
E	.26	.49	3	2
ESE	.21	.40	0	0
SE	.22	.52	0	0
SSE	.19	.48	0	1
S	.15	.39	0	0
SSW	.15	.41	0	0
SW	.16	.46	1	12
WSW	.20	.57	13	32
W	.17	.42	3	2
WNW	.18	.47	30	19
NW	.17	.41	2	2
NNW	.19	.44	1	2
N	.15	.38	0	0

TABLE C-3

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 10

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.55	2	3
NE	.29	.65	26	19
ENE	.31	.62	21	8
E	.24	.53	2	1
ESE	.21	.51	0	0
SE	.21	.49	0	0
SSE	.23	.54	0	1
S	.27	.54	1	1
SSW	.27	.55	0	5
SW	.24	.55	2	21
WSW	.19	.57	4	14
W	.17	.47	3	2
WNW	.18	.55	39	25
NW	.15	.37	0	0
NNW	.15	.38	0	0
N	.17	.48	0	0

LOCATION 11

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.18	.47	1	1
NE	.27	.61	25	17
ENE	.30	.60	25	8
E	.26	.54	5	2
ESE	.23	.52	0	0
SE	.24	.50	0	0
SSE	.27	.58	0	1
S	.31	.56	2	2
SSW	.30	.57	2	9
SW	.26	.56	5	30
WSW	.19	.55	6	15
W	.17	.48	7	3
WNW	.17	.48	22	12
NW	.15	.35	0	0
NNW	.15	.33	0	0
N	.15	.36	0	0

LOCATION 12

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.17	.42	0	0
NE	.26	.58	19	13
ENE	.31	.58	20	6
E	.28	.56	6	3
ESE	.27	.55	1	0
SE	.27	.53	0	0
SSE	.30	.62	1	2
S	.32	.58	3	2
SSW	.32	.59	3	12
SW	.28	.55	4	27
WSW	.20	.54	5	13
W	.18	.48	7	4
WNW	.17	.50	30	16
NW	.16	.42	1	1
NNW	.15	.36	0	0
N	.14	.33	0	0

1993 PHASE I BUILD CONDITION

LOCATION 10

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.18	.51	2	4
NE	.21	.52	10	11
ENE	.22	.53	13	5
E	.20	.51	3	2
ESE	.21	.49	0	0
SE	.23	.54	0	0
SSE	.28	.64	1	3
S	.23	.66	9	14
SSW	.16	.41	0	0
SW	.15	.34	0	0
WSW	.17	.52	4	16
W	.17	.46	5	4
WNW	.18	.53	52	37
NW	.17	.40	1	2
NNW	.16	.35	0	0
N	.15	.38	0	0

LOCATION 11

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.42	1	1
NE	.20	.49	13	12
ENE	.21	.49	14	5
E	.22	.50	5	3
ESE	.26	.52	2	1
SE	.28	.64	2	3
SSE	.28	.68	3	6
S	.20	.59	8	11
SSW	.16	.35	0	0
SW	.15	.33	0	1
WSW	.17	.49	6	19
W	.18	.43	7	5
WNW	.19	.47	39	27
NW	.17	.38	1	2
NNW	.15	.34	0	0
N	.15	.34	0	0

LOCATION 12

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.17	.43	0	1
NE	.19	.45	3	6
ENE	.22	.49	8	3
E	.25	.51	4	3
ESE	.30	.61	4	3
SE	.33	.72	2	6
SSE	.22	.64	1	3
S	.19	.50	1	1
SSW	.16	.35	0	0
SW	.15	.33	0	0
WSW	.17	.42	0	4
W	.18	.46	6	6
WNW	.22	.53	58	44
NW	.24	.48	11	13
NNW	.22	.44	1	2
N	.21	.46	0	1

2000 FULL-BUILD CONDITION

LOCATION 10

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.18	.52	3	5
NE	.17	.36	0	2
ENE	.19	.46	5	1
E	.23	.49	2	2
ESE	.20	.49	0	0
SE	.21	.50	0	0
SSE	.21	.56	0	2
S	.16	.43	0	0
SSW	.14	.28	0	0
SW	.15	.33	0	0
WSW	.17	.49	2	11
W	.17	.43	3	3
WNW	.21	.56	71	52
NW	.19	.48	10	12
NNW	.19	.50	3	7
N	.19	.49	1	1

LOCATION 11

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.48	0	1
NE	.24	.48	2	5
ENE	.25	.46	2	0
E	.27	.49	1	1
ESE	.29	.50	0	0
SE	.22	.44	0	0
SSE	.23	.50	0	0
S	.16	.36	0	0
SSW	.14	.28	0	0
SW	.15	.29	0	0
WSW	.19	.47	0	4
W	.22	.53	8	9
WNW	.26	.63	79	64
NW	.23	.53	8	12
NNW	.21	.48	0	2
N	.18	.48	0	0

LOCATION 12

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.41	1	2
NE	.14	.33	0	2
ENE	.13	.26	0	0
E	.15	.32	0	0
ESE	.13	.28	0	0
SE	.13	.26	0	0
SSE	.12	.23	0	0
S	.12	.25	0	0
SSW	.12	.25	0	0
SW	.13	.26	0	0
WSW	.14	.33	0	1
W	.16	.43	6	7
WNW	.18	.50	64	50
NW	.18	.48	24	25
NNW	.18	.49	6	14
N	.16	.41	0	1

TABLE C-4

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 13

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.27	.62	7	6
NE	.27	.58	14	10
ENE	.29	.57	14	3
E	.25	.53	3	1
ESE	.23	.53	0	0
SE	.26	.57	0	0
SSE	.31	.62	0	1
S	.33	.62	3	2
SSW	.34	.66	6	16
SW	.29	.62	10	36
WSW	.20	.50	1	4
W	.17	.45	2	1
WNW	.18	.50	21	9
NW	.19	.53	13	7
NNW	.15	.39	0	0
N	.24	.64	6	4

LOCATION 14

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.56	3	2
NE	.24	.57	12	8
ENE	.28	.57	14	2
E	.24	.53	3	1
ESE	.20	.48	0	0
SE	.20	.52	0	0
SSE	.24	.52	0	0
S	.29	.56	1	0
SSW	.33	.70	12	21
SW	.28	.64	13	35
WSW	.22	.61	10	15
W	.19	.58	25	9
WNW	.15	.35	0	0
NW	.16	.41	0	0
NNW	.21	.57	6	4
N	.22	.56	2	1

LOCATION 15

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.21	.60	3	3
NE	.22	.61	14	10
ENE	.25	.61	15	3
E	.19	.51	1	0
ESE	.18	.42	0	0
SE	.20	.48	0	0
SSE	.18	.46	0	0
S	.23	.56	1	0
SSW	.25	.69	5	15
SW	.21	.59	3	17
WSW	.22	.68	15	26
W	.20	.63	30	15
WNW	.21	.36	0	0
NW	.20	.39	0	0
NNW	.23	.61	8	7
N	.24	.66	5	3

1993 PHASE I BUILD CONDITION

LOCATION 13

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.53	2	4
NE	.16	.43	1	3
ENE	.17	.42	1	0
E	.15	.35	0	0
ESE	.14	.29	0	0
SE	.15	.32	0	0
SSE	.15	.33	0	0
S	.14	.28	0	0
SSW	.14	.30	0	0
SW	.14	.30	0	0
WSW	.16	.38	0	0
W	.18	.47	3	3
WNW	.18	.58	62	47
NW	.22	.55	21	22
NNW	.23	.59	8	16
N	.28	.60	3	5

LOCATION 14

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.24	.52	0	0
NE	.21	.54	1	3
ENE	.20	.57	3	1
E	.18	.46	0	0
ESE	.24	.59	0	0
SE	.27	.61	0	0
SSE	.32	.66	0	1
S	.30	.60	0	0
SSW	.28	.60	0	2
SW	.22	.55	0	6
WSW	.22	.59	1	5
W	.26	.69	18	17
WNW	.26	.70	55	41
NW	.23	.68	21	21
NNW	.22	.58	0	2
N	.29	.58	0	0

LOCATION 15

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.46	0	0
NE	.21	.56	3	6
ENE	.23	.66	14	6
E	.20	.34	0	0
ESE	.22	.40	0	0
SE	.23	.37	0	0
SSE	.21	.41	0	0
S	.19	.38	0	0
SSW	.18	.42	0	0
SW	.18	.43	0	1
WSW	.22	.62	3	14
W	.25	.60	10	9
WNW	.23	.62	36	28
NW	.23	.67	31	28
NNW	.22	.63	4	8
N	.20	.54	0	0

2000 FULL-BUILD CONDITION

LOCATION 13

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.21	.53	2	4
NE	.15	.36	0	1
ENE	.13	.26	0	0
E	.14	.28	0	0
ESE	.14	.30	0	0
SE	.14	.31	0	0
SSE	.14	.27	0	0
S	.13	.25	0	0
SSW	.14	.29	0	0
SW	.14	.30	0	0
WSW	.15	.38	0	1
W	.19	.45	3	3
WNW	.19	.53	40	33
NW	.23	.59	46	41
NNW	.22	.56	7	15
N	.22	.54	1	3

LOCATION 14

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.21	.48	0	0
NE	.24	.59	2	4
ENE	.30	.59	2	1
E	.19	.44	0	0
ESE	.17	.45	0	0
SE	.21	.46	0	0
SSE	.25	.56	0	0
S	.31	.60	0	0
SSW	.25	.60	0	1
SW	.20	.49	0	1
WSW	.21	.57	0	2
W	.26	.71	13	14
WNW	.24	.72	41	36
NW	.25	.80	43	41
NNW	.23	.53	0	0
N	.28	.56	0	0

LOCATION 15

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.44	0	0
NE	.21	.57	4	7
ENE	.22	.62	9	3
E	.19	.50	0	0
ESE	.21	.36	0	0
SE	.23	.35	0	0
SSE	.22	.35	0	0
S	.21	.38	0	0
SSW	.19	.38	0	0
SW	.17	.42	0	0
WSW	.20	.60	2	11
W	.22	.60	8	8
WNW	.21	.59	25	21
NW	.25	.71	49	41
NNW	.22	.62	3	8
N	.19	.56	0	0

TABLE C-5

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 16

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.56	2	2
NE	.27	.63	19	12
ENE	.36	.65	24	6
E	.34	.61	6	2
ESE	.28	.57	0	0
SE	.20	.58	0	0
SSE	.23	.53	0	0
S	.28	.61	2	1
SSW	.31	.65	3	10
SW	.26	.60	4	21
WSW	.27	.70	21	35
W	.19	.57	15	6
WNW	.14	.41	2	1
NW	.15	.42	0	0
NNW	.16	.45	0	0
N	.18	.52	0	0

LOCATION 17

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.17	.50	1	2
NE	.26	.62	23	16
ENE	.35	.63	27	10
E	.33	.58	6	3
ESE	.32	.60	2	0
SE	.24	.60	0	0
SSE	.28	.56	0	1
S	.25	.59	3	2
SSW	.28	.61	3	13
SW	.22	.55	2	21
WSW	.20	.49	1	4
W	.16	.42	1	0
WNW	.15	.39	2	1
NW	.16	.40	0	0
NNW	.17	.49	1	2
N	.31	.79	28	24

LOCATION 18

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.51	2	2
NE	.25	.59	23	14
ENE	.33	.60	28	8
E	.28	.55	5	2
ESE	.27	.54	1	0
SE	.22	.51	0	0
SSE	.28	.57	0	1
S	.24	.57	3	2
SSW	.27	.64	8	22
SW	.20	.54	4	23
WSW	.20	.51	3	8
W	.17	.42	2	1
WNW	.14	.37	1	1
NW	.14	.38	0	0
NNW	.16	.53	5	6
N	.24	.66	12	10

1993 PHASE I BUILD CONDITION

LOCATION 16

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.11	.23	0	0
NE	.11	.23	0	0
ENE	.15	.45	26	14
E	.15	.38	3	2
ESE	.12	.29	0	0
SE	.12	.28	0	0
SSE	.16	.40	0	1
S	.15	.42	2	3
SSW	.12	.33	0	1
SW	.12	.26	0	1
WSW	.12	.30	0	2
W	.14	.37	10	11
WNW	.14	.36	22	20
NW	.15	.41	33	33
NNW	.14	.40	5	12
N	.12	.28	0	0

LOCATION 17

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.17	.48	0	0
NE	.16	.38	0	0
ENE	.25	.59	4	0
E	.20	.45	0	0
ESE	.19	.56	0	0
SE	.27	.62	0	0
SSE	.40	.69	0	0
S	.47	.82	6	3
SSW	.36	.83	7	14
SW	.32	.87	29	56
WSW	.20	.56	0	1
W	.19	.52	1	0
WNW	.19	.51	3	1
NW	.28	.70	25	9
NNW	.40	.82	25	15
N	.31	.67	1	0

LOCATION 18

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.17	.50	0	0
NE	.16	.44	0	0
ENE	.19	.54	2	0
E	.27	.67	4	1
ESE	.40	.85	8	3
SE	.29	.65	0	0
SSE	.32	.65	0	0
S	.28	.66	1	0
SSW	.30	.72	2	7
SW	.36	.80	18	48
WSW	.20	.62	2	5
W	.18	.55	3	1
WNW	.21	.54	8	3
NW	.30	.69	29	13
NNW	.37	.78	23	17
N	.26	.65	1	1

2000 FULL-BUILD CONDITION

LOCATION 16

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.11	.22	0	0
NE	.11	.23	0	0
ENE	.13	.36	6	2
E	.14	.42	6	4
ESE	.11	.25	0	0
SE	.12	.26	0	0
SSE	.14	.38	0	1
S	.18	.46	5	8
SSW	.13	.36	0	3
SW	.12	.29	0	2
WSW	.12	.32	0	3
W	.14	.37	9	9
WNW	.14	.37	28	23
NW	.16	.43	45	38
NNW	.14	.38	2	7
N	.11	.25	0	0

LOCATION 17

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.46	0	0
NE	.14	.34	0	0
ENE	.20	.49	1	0
E	.17	.48	0	0
ESE	.20	.60	0	0
SE	.23	.53	0	0
SSE	.34	.57	0	0
S	.45	.73	2	1
SSW	.36	.75	2	5
SW	.42	.89	39	68
WSW	.20	.60	1	2
W	.18	.49	0	0
WNW	.20	.56	10	3
NW	.32	.69	26	9
NNW	.40	.78	19	11
N	.28	.65	1	0

LOCATION 18

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.17	.45	0	0
NE	.13	.36	0	0
ENE	.16	.44	0	0
E	.23	.62	2	1
ESE	.27	.66	0	0
SE	.18	.46	0	0
SSE	.19	.48	0	0
S	.24	.58	0	0
SSW	.25	.63	0	2
SW	.40	.79	16	48
WSW	.22	.64	3	7
W	.18	.53	1	0
WNW	.21	.59	17	8
NW	.33	.72	42	20
NNW	.37	.76	18	14
N	.24	.62	1	0

TABLE C-6

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 19

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.50	3	3
NE	.23	.54	19	13
ENE	.30	.56	24	7
E	.26	.50	4	2
ESE	.27	.54	2	0
SE	.21	.49	0	0
SSE	.26	.57	1	1
S	.21	.62	8	7
SSW	.22	.62	11	27
SW	.17	.46	1	10
WSW	.20	.52	7	15
W	.17	.44	6	2
WNW	.13	.31	0	0
NW	.14	.37	0	0
NNW	.14	.43	1	1
N	.22	.63	13	10

LOCATION 20

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.24	.63	8	9
NE	.27	.58	15	12
ENE	.33	.60	20	7
E	.30	.55	4	2
ESE	.27	.57	1	0
SE	.27	.55	0	0
SSE	.28	.65	1	2
S	.21	.68	7	8
SSW	.20	.55	0	5
SW	.17	.48	0	7
WSW	.23	.59	8	20
W	.23	.55	16	11
WNW	.16	.42	4	3
NW	.15	.37	0	0
NNW	.15	.40	0	0
N	.30	.72	15	14

LOCATION 21

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.25	.61	5	6
NE	.25	.56	9	9
ENE	.30	.55	10	2
E	.27	.51	1	1
ESE	.22	.54	0	0
SE	.25	.60	0	0
SSE	.24	.67	1	2
S	.21	.64	4	3
SSW	.19	.49	0	1
SW	.16	.44	0	2
WSW	.24	.65	13	30
W	.27	.66	48	35
WNW	.18	.44	5	4
NW	.14	.35	0	0
NNW	.15	.40	0	0
N	.24	.65	5	5

1993 PHASE I BUILD CONDITION

LOCATION 19

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.52	1	2
NE	.12	.31	0	0
ENE	.13	.33	0	0
E	.14	.29	0	0
ESE	.18	.34	0	0
SE	.13	.26	0	0
SSE	.14	.29	0	0
S	.14	.31	0	0
SSW	.13	.38	0	0
SW	.12	.29	0	0
WSW	.13	.33	0	0
W	.13	.31	0	0
WNW	.14	.38	1	1
NW	.24	.61	31	27
NNW	.33	.79	59	59
N	.22	.72	10	13

LOCATION 20

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.25	.56	6	3
NE	.15	.35	0	0
ENE	.15	.35	0	0
E	.13	.27	0	0
ESE	.15	.31	0	0
SE	.18	.43	0	0
SSE	.30	.65	1	2
S	.26	.62	7	3
SSW	.26	.59	4	9
SW	.26	.63	25	47
WSW	.24	.58	12	16
W	.19	.46	6	1
WNW	.14	.40	5	1
NW	.18	.43	3	1
NNW	.21	.55	10	6
N	.33	.70	21	10

LOCATION 21

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.26	.61	16	12
NE	.14	.35	0	1
ENE	.14	.32	0	0
E	.17	.37	0	0
ESE	.17	.43	0	0
SE	.28	.57	0	0
SSE	.31	.72	4	5
S	.19	.55	4	2
SSW	.19	.50	1	5
SW	.18	.47	1	13
WSW	.20	.56	14	25
W	.20	.50	23	11
WNW	.13	.36	3	2
NW	.16	.43	6	3
NNW	.18	.49	6	6
N	.29	.64	18	13

2000 FULL-BUILD CONDITION

LOCATION 19

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.15	.47	0	1
NE	.12	.28	0	0
ENE	.12	.32	0	0
E	.12	.27	0	0
ESE	.14	.30	0	0
SE	.13	.25	0	0
SSE	.13	.27	0	0
S	.13	.28	0	0
SSW	.13	.34	0	0
SW	.12	.26	0	0
WSW	.12	.31	0	0
W	.13	.33	0	0
WNW	.14	.39	1	1
NW	.26	.65	54	44
NNW	.34	.75	43	49
N	.21	.66	5	7

LOCATION 20

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.26	.57	7	4
NE	.13	.29	0	0
ENE	.15	.37	1	0
E	.13	.30	0	0
ESE	.16	.34	0	0
SE	.21	.52	0	0
SSE	.32	.67	2	2
S	.28	.67	11	7
SSW	.26	.57	3	7
SW	.27	.61	19	42
WSW	.23	.56	11	15
W	.18	.45	6	1
WNW	.14	.37	2	1
NW	.18	.46	7	2
NNW	.21	.55	12	7
N	.32	.69	19	10

LOCATION 21

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.25	.59	12	10
NE	.13	.33	0	1
ENE	.14	.33	0	0
E	.15	.34	0	0
ESE	.18	.42	0	0
SE	.31	.70	3	3
SSE	.31	.70	3	4
S	.19	.57	5	4
SSW	.19	.48	0	3
SW	.19	.48	2	15
WSW	.19	.52	7	15
W	.20	.54	36	20
WNW	.14	.33	1	0
NW	.16	.42	4	2
NNW	.18	.52	8	8
N	.28	.66	19	14

TABLE C-7

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 22

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.21	.58	1	1
NE	.28	.60	7	6
ENE	.32	.59	7	1
E	.31	.62	3	2
ESE	.20	.54	0	0
SE	.29	.60	0	0
SSE	.39	.75	1	2
S	.34	.79	8	7
SSW	.24	.60	0	2
SW	.23	.63	2	17
WSW	.29	.72	13	25
W	.29	.74	50	30
WNW	.16	.48	4	2
NW	.14	.40	0	0
NNW	.15	.48	0	0
N	.30	.70	4	3

LOCATION 23

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.23	.60	3	3
NE	.31	.60	10	9
ENE	.30	.52	4	1
E	.26	.57	2	1
ESE	.15	.45	0	0
SE	.28	.59	0	0
SSE	.33	.63	0	1
S	.36	.66	3	2
SSW	.34	.71	6	18
SW	.24	.56	1	12
WSW	.23	.58	4	9
W	.19	.69	49	31
WNW	.15	.47	6	3
NW	.15	.43	0	0
NNW	.18	.58	4	5
N	.28	.71	7	6

LOCATION 24

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.29	.57	1	2
NE	.37	.64	14	11
ENE	.38	.62	12	3
E	.35	.65	6	3
ESE	.21	.48	0	0
SE	.32	.64	0	0
SSE	.36	.66	0	1
S	.39	.65	2	2
SSW	.38	.64	1	6
SW	.32	.58	1	12
WSW	.30	.63	5	13
W	.24	.70	40	28
WNW	.20	.50	8	5
NW	.20	.49	1	1
NNW	.24	.63	6	8
N	.30	.67	3	3

1993 PHASE I BUILD CONDITION

LOCATION 22

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.11	.23	0	0
NE	.11	.21	0	0
ENE	.11	.22	0	0
E	.12	.22	0	0
ESE	.13	.33	0	0
SE	.17	.40	0	0
SSE	.24	.50	1	2
S	.26	.60	23	23
SSW	.18	.52	12	24
SW	.15	.41	3	16
WSW	.16	.44	8	14
W	.16	.44	32	14
WNW	.13	.37	22	8
NW	.12	.25	0	0
NNW	.11	.25	0	0
N	.12	.25	0	0

LOCATION 23

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.12	.29	0	0
NE	.12	.23	0	0
ENE	.13	.32	0	0
E	.22	.52	2	1
ESE	.22	.54	0	0
SE	.24	.49	0	0
SSE	.19	.46	0	0
S	.16	.45	0	0
SSW	.19	.49	0	1
SW	.19	.48	0	6
WSW	.24	.65	15	32
W	.26	.70	73	54
WNW	.15	.46	9	6
NW	.13	.38	0	0
NNW	.12	.24	0	0
N	.12	.27	0	0

LOCATION 24

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.17	.37	1	3
NE	.18	.40	11	13
ENE	.21	.45	25	13
E	.25	.56	34	19
ESE	.25	.59	25	35
SE	.18	.36	0	0
SSE	.16	.33	0	0
S	.18	.31	0	0
SSW	.18	.31	0	1
SW	.16	.32	0	6
WSW	.16	.33	0	4
W	.17	.32	1	2
WNW	.15	.28	2	2
NW	.14	.24	0	0
NNW	.15	.26	0	0
N	.15	.29	0	0

2000 FULL-BUILD CONDITION

LOCATION 22

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.12	.22	0	0
NE	.11	.21	0	0
ENE	.11	.20	0	0
E	.12	.23	0	0
ESE	.13	.34	0	0
SE	.20	.48	0	0
SSE	.25	.51	1	2
S	.25	.60	23	20
SSW	.18	.57	27	37
SW	.15	.43	4	17
WSW	.16	.44	9	13
W	.16	.43	25	8
WNW	.12	.34	11	3
NW	.12	.28	0	0
NNW	.12	.24	0	0
N	.12	.25	0	0

LOCATION 23

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.12	.25	0	0
NE	.12	.30	0	0
ENE	.16	.42	1	0
E	.26	.52	2	1
ESE	.31	.64	3	1
SE	.30	.62	0	0
SSE	.21	.49	0	0
S	.17	.46	0	0
SSW	.20	.51	0	2
SW	.19	.50	0	9
WSW	.23	.65	16	33
W	.26	.69	72	51
WNW	.15	.43	5	3
NW	.13	.39	0	0
NNW	.12	.27	0	0
N	.11	.25	0	0

LOCATION 24

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.31	0	0
NE	.19	.39	6	9
ENE	.25	.51	36	21
E	.27	.58	30	18
ESE	.30	.63	27	40
SE	.18	.40	0	0
SSE	.16	.32	0	0
S	.17	.30	0	0
SSW	.18	.30	0	0
SW	.17	.34	0	8
WSW	.16	.31	0	2
W	.15	.31	0	1
WNW	.14	.27	0	1
NW	.14	.24	0	0
NNW	.14	.25	0	0
N	.14	.24	0	0

TABLE C-8

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 25

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.24	.57	2	2
NE	.34	.64	17	13
ENE	.34	.56	7	1
E	.31	.58	3	2
ESE	.20	.50	0	0
SE	.25	.57	0	0
SSE	.32	.60	0	1
S	.36	.63	2	1
SSW	.34	.64	1	8
SW	.28	.57	1	14
WSW	.27	.62	6	15
W	.24	.67	40	26
WNW	.17	.49	8	5
NW	.16	.48	2	2
NNW	.20	.59	4	5
N	.24	.69	5	5

LOCATION 26

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.25	.57	4	5
NE	.34	.62	23	18
ENE	.34	.59	19	7
E	.31	.62	9	5
ESE	.27	.61	2	1
SE	.18	.51	0	0
SSE	.26	.57	0	1
S	.26	.53	1	1
SSW	.23	.51	0	3
SW	.20	.46	0	6
WSW	.22	.56	6	18
W	.19	.58	25	20
WNW	.14	.41	3	3
NW	.15	.45	2	3
NNW	.18	.54	4	7
N	.18	.58	2	3

LOCATION 27

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.26	.57	2	2
NE	.36	.65	19	13
ENE	.38	.64	17	5
E	.33	.65	7	3
ESE	.31	.70	3	1
SE	.20	.57	0	0
SSE	.26	.62	0	1
S	.34	.63	2	1
SSW	.34	.62	1	6
SW	.31	.59	2	17
WSW	.31	.68	13	27
W	.24	.64	28	16
WNW	.15	.44	2	1
NW	.16	.49	2	2
NNW	.19	.54	1	2
N	.19	.51	0	0

1993 PHASE I BUILD CONDITION

LOCATION 25

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.12	.27	0	0
NE	.13	.30	3	4
ENE	.15	.37	18	5
E	.18	.48	29	12
ESE	.19	.52	24	19
SE	.13	.34	0	0
SSE	.15	.40	0	1
S	.21	.47	13	15
SSW	.18	.43	8	24
SW	.16	.34	2	16
WSW	.16	.31	1	5
W	.12	.25	0	0
WNW	.11	.21	0	0
NW	.12	.21	0	0
NNW	.11	.20	0	0
N	.12	.26	0	0

LOCATION 26

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.18	.51	4	8
NE	.23	.55	22	22
ENE	.26	.60	37	25
E	.23	.58	12	9
ESE	.24	.61	6	9
SE	.16	.50	0	0
SSE	.16	.41	0	0
S	.13	.28	0	0
SSW	.12	.27	0	0
SW	.12	.28	0	0
WSW	.12	.23	0	0
W	.12	.25	0	0
WNW	.15	.44	21	24
NW	.12	.29	0	0
NNW	.14	.36	0	0
N	.15	.42	0	1

LOCATION 27

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.21	.54	1	4
NE	.21	.49	3	6
ENE	.20	.50	4	2
E	.19	.49	1	1
ESE	.24	.55	0	0
SE	.18	.52	0	0
SSE	.21	.46	0	0
S	.21	.49	0	0
SSW	.18	.50	0	2
SW	.17	.39	0	1
WSW	.17	.39	0	1
W	.16	.49	3	4
WNW	.21	.64	85	69
NW	.16	.44	1	2
NNW	.17	.47	0	2
N	.21	.60	2	5

2000 FULL-BUILD CONDITION

LOCATION 25

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.12	.28	0	0
NE	.15	.35	1	3
ENE	.24	.53	30	17
E	.26	.64	34	20
ESE	.31	.70	33	50
SE	.14	.40	0	0
SSE	.15	.42	0	1
S	.19	.46	2	3
SSW	.17	.37	0	1
SW	.16	.35	0	5
WSW	.14	.29	0	0
W	.12	.25	0	0
WNW	.11	.22	0	0
NW	.12	.23	0	0
NNW	.11	.21	0	0
N	.12	.22	0	0

LOCATION 26

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.14	.41	0	0
NE	.15	.38	1	1
ENE	.23	.53	14	2
E	.29	.59	10	3
ESE	.31	.65	7	2
SE	.20	.54	0	0
SSE	.19	.48	0	0
S	.14	.39	0	0
SSW	.18	.52	1	3
SW	.28	.64	27	56
WSW	.22	.61	17	25
W	.14	.42	2	0
WNW	.17	.46	20	7
NW	.15	.39	1	0
NNW	.13	.35	0	0
N	.12	.29	0	0

LOCATION 27

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.15	.38	0	0
NE	.20	.47	1	1
ENE	.33	.65	21	4
E	.36	.70	12	4
ESE	.40	.80	12	4
SE	.21	.60	0	0
SSE	.18	.53	0	0
S	.17	.45	0	0
SSW	.23	.61	1	3
SW	.32	.74	26	52
WSW	.29	.74	24	32
W	.15	.50	3	0
WNW	.13	.37	0	0
NW	.13	.35	0	0
NNW	.13	.32	0	0
N	.13	.33	0	0

TABLE C-9

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 28

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.24	.53	1	2
NE	.33	.60	14	10
ENE	.34	.60	15	3
E	.32	.55	3	1
ESE	.31	.59	1	0
SE	.23	.54	0	0
SSE	.29	.57	0	1
S	.36	.64	3	2
SSW	.30	.59	1	5
SW	.29	.57	2	17
WSW	.32	.68	16	31
W	.29	.63	31	17
WNW	.19	.46	7	4
NW	.18	.43	0	0
NNW	.21	.55	3	4
N	.23	.62	3	2

LOCATION 29

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.54	1	1
NE	.29	.60	14	9
ENE	.33	.59	14	3
E	.29	.57	4	1
ESE	.30	.61	1	0
SE	.23	.56	0	0
SSE	.31	.60	0	1
S	.31	.69	6	4
SSW	.30	.62	2	7
SW	.28	.62	5	25
WSW	.29	.68	17	29
W	.24	.61	26	12
WNW	.15	.39	1	0
NW	.15	.42	0	0
NNW	.17	.53	2	2
N	.22	.67	6	5

LOCATION 30

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.52	2	2
NE	.25	.60	21	13
ENE	.33	.61	24	7
E	.30	.57	6	2
ESE	.32	.62	2	1
SE	.22	.60	0	0
SSE	.28	.57	0	1
S	.27	.62	4	3
SSW	.29	.63	4	14
SW	.22	.56	3	21
WSW	.23	.59	9	19
W	.19	.51	10	4
WNW	.14	.36	1	0
NW	.14	.44	2	1
NNW	.15	.48	1	1
N	.25	.69	12	10

1993 PHASE I BUILD CONDITION

LOCATION 28

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.18	.42	0	0
NE	.17	.41	1	2
ENE	.17	.44	3	0
E	.20	.50	3	1
ESE	.23	.54	1	0
SE	.18	.53	0	0
SSE	.18	.44	0	0
S	.17	.35	0	0
SSW	.19	.41	0	0
SW	.32	.66	32	65
WSW	.23	.53	5	9
W	.20	.43	2	0
WNW	.22	.51	42	16
NW	.18	.45	5	2
NNW	.20	.51	4	3
N	.17	.39	0	0

LOCATION 29

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.15	.39	0	0
NE	.26	.57	8	11
ENE	.43	.77	48	30
E	.47	.76	21	13
ESE	.48	.79	11	16
SE	.28	.66	0	0
SSE	.24	.55	0	1
S	.14	.33	0	0
SSW	.15	.34	0	0
SW	.20	.43	0	3
WSW	.20	.41	0	1
W	.16	.36	0	0
WNW	.15	.34	0	0
NW	.20	.50	3	6
NNW	.28	.61	6	15
N	.23	.59	1	3

LOCATION 30

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.45	0	0
NE	.17	.49	1	3
ENE	.19	.60	9	3
E	.17	.56	1	1
ESE	.19	.70	2	2
SE	.22	.66	0	0
SSE	.23	.65	0	1
S	.18	.43	0	0
SSW	.17	.44	0	0
SW	.21	.50	0	5
WSW	.18	.47	0	1
W	.15	.39	0	0
WNW	.16	.43	1	2
NW	.19	.69	51	40
NNW	.24	.77	32	38
N	.21	.65	2	4

2000 FULL-BUILD CONDITION

LOCATION 28

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.51	1	2
NE	.25	.53	8	10
ENE	.36	.69	41	21
E	.38	.74	26	14
ESE	.36	.70	7	7
SE	.20	.53	0	0
SSE	.21	.42	0	0
S	.24	.45	0	0
SSW	.22	.47	0	1
SW	.22	.51	1	17
WSW	.19	.47	1	5
W	.18	.44	1	1
WNW	.19	.42	4	4
NW	.18	.48	5	7
NNW	.21	.53	3	7
N	.20	.54	1	2

LOCATION 29

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.14	.35	0	0
NE	.18	.51	2	5
ENE	.35	.74	34	21
E	.46	.86	31	19
ESE	.49	.91	23	35
SE	.20	.56	0	0
SSE	.14	.36	0	0
S	.13	.25	0	0
SSW	.14	.29	0	0
SW	.17	.38	0	0
WSW	.17	.37	0	0
W	.15	.33	0	0
WNW	.15	.36	0	0
NW	.22	.56	7	11
NNW	.28	.59	3	9
N	.20	.54	0	1

LOCATION 30

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.15	.43	0	0
NE	.14	.41	0	1
ENE	.17	.44	0	0
E	.21	.64	2	2
ESE	.22	.68	0	0
SE	.16	.48	0	0
SSE	.20	.55	0	0
S	.26	.61	0	0
SSW	.17	.47	0	0
SW	.20	.50	0	2
WSW	.17	.44	0	0
W	.15	.42	0	0
WNW	.16	.46	1	1
NW	.22	.79	71	57
NNW	.23	.81	25	34
N	.21	.67	1	2

TABLE C-10

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 31

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.21	.55	2	2
NE	.31	.64	22	13
ENE	.33	.62	19	4
E	.30	.58	4	2
ESE	.31	.62	2	0
SE	.22	.62	0	0
SSE	.28	.59	0	1
S	.33	.64	4	2
SSW	.28	.59	1	5
SW	.29	.62	6	28
WSW	.30	.66	15	27
W	.23	.58	18	8
WNW	.15	.40	1	1
NW	.15	.44	1	0
NNW	.17	.54	2	3
N	.21	.62	3	2

LOCATION 32

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.18	.49	1	1
NE	.26	.58	13	9
ENE	.30	.58	14	2
E	.29	.56	4	1
ESE	.32	.62	2	0
SE	.21	.63	0	0
SSE	.28	.61	0	1
S	.35	.65	5	2
SSW	.29	.61	2	6
SW	.29	.62	8	29
WSW	.30	.69	23	35
W	.24	.58	23	9
WNW	.15	.41	2	1
NW	.15	.43	1	0
NNW	.16	.48	1	1
N	.18	.52	0	0

LOCATION 33

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.21	.54	3	2
NE	.30	.60	23	13
ENE	.31	.57	17	3
E	.29	.55	4	2
ESE	.28	.59	2	0
SE	.18	.58	0	0
SSE	.24	.54	0	1
S	.31	.61	4	2
SSW	.29	.60	2	8
SW	.29	.60	9	32
WSW	.26	.63	16	25
W	.18	.50	8	3
WNW	.15	.41	5	2
NW	.15	.42	1	1
NNW	.17	.53	4	4
N	.19	.54	1	1

1993 PHASE I BUILD CONDITION

LOCATION 31

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.18	.49	0	0
NE	.24	.51	0	1
ENE	.38	.71	14	3
E	.41	.73	6	3
ESE	.42	.77	2	0
SE	.32	.71	0	0
SSE	.31	.69	0	1
S	.22	.54	0	0
SSW	.19	.49	0	0
SW	.34	.77	10	39
WSW	.37	.74	8	17
W	.29	.63	7	3
WNW	.28	.66	36	18
NW	.19	.57	2	2
NNW	.27	.76	13	12
N	.24	.65	1	1

LOCATION 32

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.55	0	0
NE	.17	.43	0	0
ENE	.25	.58	3	0
E	.28	.63	2	1
ESE	.25	.62	0	0
SE	.21	.60	0	0
SSE	.20	.58	0	0
S	.21	.54	0	0
SSW	.21	.53	0	0
SW	.40	.84	23	46
WSW	.35	.90	33	41
W	.22	.75	35	12
WNW	.16	.52	4	1
NW	.13	.30	0	0
NNW	.13	.31	0	0
N	.18	.54	0	0

LOCATION 33

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.14	.37	9	5
NE	.14	.32	9	5
ENE	.13	.26	2	0
E	.15	.36	8	2
ESE	.16	.40	6	1
SE	.16	.40	1	0
SSE	.16	.38	1	1
S	.19	.47	20	15
SSW	.15	.42	13	20
SW	.15	.38	17	37
WSW	.14	.35	8	10
W	.13	.27	3	0
WNW	.13	.24	3	1
NW	.13	.23	0	0
NNW	.12	.24	0	0
N	.13	.25	0	0

2000 FULL-BUILD CONDITION

LOCATION 31

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.15	.41	0	0
NE	.23	.51	1	2
ENE	.33	.67	12	4
E	.27	.64	2	2
ESE	.39	.80	4	3
SE	.28	.67	0	0
SSE	.28	.75	0	2
S	.25	.51	0	0
SSW	.24	.51	0	0
SW	.26	.63	1	16
WSW	.27	.60	1	6
W	.28	.66	14	11
WNW	.25	.60	20	14
NW	.24	.71	36	27
NNW	.24	.71	8	13
N	.18	.49	0	0

LOCATION 32

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.17	.50	1	1
NE	.17	.45	1	3
ENE	.23	.59	13	5
E	.23	.62	7	4
ESE	.29	.71	5	4
SE	.23	.65	0	0
SSE	.22	.63	0	1
S	.21	.52	0	0
SSW	.26	.53	0	3
SW	.27	.54	1	17
WSW	.24	.52	1	6
W	.23	.59	21	17
WNW	.22	.58	44	30
NW	.16	.38	0	0
NNW	.18	.48	0	1
N	.22	.66	5	7

LOCATION 33

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.14	.30	0	1
NE	.13	.27	1	2
ENE	.15	.33	7	2
E	.17	.47	23	12
ESE	.23	.55	32	38
SE	.18	.43	1	1
SSE	.19	.49	2	5
S	.15	.40	4	5
SSW	.14	.28	0	0
SW	.14	.28	0	3
WSW	.14	.27	0	1
W	.13	.30	3	2
WNW	.15	.33	25	19
NW	.14	.25	0	0
NNW	.16	.31	1	3
N	.16	.36	1	2

TABLE C-11

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 34

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.23	.54	2	2
NE	.35	.65	25	14
ENE	.33	.63	23	7
E	.29	.57	4	2
ESE	.30	.59	1	0
SE	.18	.59	0	0
SSE	.22	.54	0	0
S	.31	.58	2	1
SSW	.29	.58	1	5
SW	.38	.57	3	20
WSW	.56	.84	13	26
W	.22	.56	16	9
WNW	.16	.45	6	4
NW	.15	.42	0	0
NNW	.20	.57	6	7
N	.19	.53	1	1

LOCATION 35

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.27	.57	3	3
NE	.36	.65	24	14
ENE	.35	.65	20	5
E	.31	.58	4	2
ESE	.26	.57	0	0
SE	.21	.60	0	0
SSE	.26	.58	0	1
S	.32	.63	3	2
SSW	.30	.59	1	5
SW	.32	.61	6	28
WSW	.30	.65	13	24
W	.19	.49	4	1
WNW	.16	.48	11	5
NW	.15	.44	1	0
NNW	.20	.54	6	9
N	.22	.55	1	1

LOCATION 36

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.21	.55	3	3
NE	.30	.62	22	14
ENE	.31	.61	22	6
E	.31	.58	6	3
ESE	.26	.53	0	0
SE	.22	.61	0	0
SSE	.26	.52	0	1
S	.30	.59	3	2
SSW	.31	.58	1	7
SW	.27	.58	4	25
WSW	.27	.60	9	18
W	.19	.52	10	5
WNW	.15	.44	7	4
NW	.17	.47	4	2
NNW	.20	.56	6	7
N	.22	.57	2	2

1993 PHASE I BUILD CONDITION

LOCATION 34

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.28	.78	20	15
NE	.30	.84	5	5
ENE	.28	.82	15	3
E	.27	.82	5	2
ESE	.28	.70	4	1
SE	.24	.73	1	0
SSE	.25	.71	1	2
S	.29	.66	3	2
SSW	.21	.48	0	0
SW	.30	.64	6	29
WSW	.31	.69	15	28
W	.24	.60	17	8
WNW	.17	.47	6	3
NW	.14	.35	0	0
NNW	.16	.44	0	0
N	.18	.59	1	1

LOCATION 35

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.30	.65	7	7
NE	.26	.62	17	13
ENE	.27	.62	20	6
E	.24	.65	10	4
ESE	.31	.76	10	6
SE	.30	.73	1	1
SSE	.35	.74	1	3
S	.40	.76	12	13
SSW	.29	.70	7	23
SW	.25	.53	1	10
WSW	.18	.52	1	5
W	.19	.50	4	2
WNW	.17	.46	6	4
NW	.17	.42	0	0
NNW	.15	.42	0	0
N	.17	.52	0	0

LOCATION 36

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.64	6	7
NE	.20	.61	14	11
ENE	.30	.65	24	8
E	.32	.73	17	8
ESE	.28	.74	8	5
SE	.30	.80	2	3
SSE	.26	.71	1	2
S	.34	.74	9	11
SSW	.29	.75	14	37
SW	.17	.46	0	3
WSW	.16	.39	0	0
W	.14	.38	0	0
WNW	.15	.43	3	2
NW	.15	.37	0	0
NNW	.16	.45	0	0
N	.19	.56	1	1

2000 FULL-BUILD CONDITION

LOCATION 34

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.13	.27	1	2
NE	.13	.25	1	3
ENE	.14	.31	13	5
E	.14	.34	7	4
ESE	.17	.48	32	38
SE	.15	.36	0	0
SSE	.15	.36	1	2
S	.14	.31	1	1
SSW	.13	.26	0	1
SW	.13	.24	0	3
WSW	.13	.27	1	4
W	.14	.30	14	12
WNW	.14	.29	27	20
NW	.14	.25	2	2
NNW	.13	.24	0	1
N	.13	.29	0	1

LOCATION 35

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.30	.61	7	8
NE	.24	.59	19	15
ENE	.23	.54	11	3
E	.23	.62	10	5
ESE	.38	.83	29	30
SE	.31	.73	2	3
SSE	.34	.70	1	3
S	.25	.63	4	5
SSW	.20	.49	0	2
SW	.21	.46	0	7
WSW	.17	.42	0	1
W	.15	.41	1	0
WNW	.18	.45	11	8
NW	.16	.41	1	1
NNW	.23	.51	2	5
N	.27	.57	2	3

LOCATION 36

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.18	.53	3	4
NE	.21	.59	21	17
ENE	.16	.43	2	0
E	.18	.52	3	2
ESE	.23	.59	2	1
SE	.26	.64	0	1
SSE	.40	.76	3	6
S	.33	.75	18	29
SSW	.20	.51	0	4
SW	.16	.34	0	0
WSW	.15	.38	0	1
W	.16	.52	14	11
WNW	.17	.50	32	22
NW	.16	.37	0	0
NNW	.16	.40	0	0
N	.17	.46	0	0

TABLE C-12

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 37

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.23	.54	2	2
NE	.32	.62	18	13
ENE	.32	.59	15	4
E	.31	.58	4	2
ESE	.29	.60	1	0
SE	.30	.62	0	0
SSE	.30	.65	0	2
S	.32	.60	2	2
SSW	.32	.60	1	7
SW	.31	.58	3	23
WSW	.24	.57	4	12
W	.17	.51	6	3
WNW	.16	.52	24	14
NW	.20	.56	18	12
NNW	.16	.46	0	0
N	.23	.55	1	1

LOCATION 38

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.25	.61	3	4
NE	.33	.68	21	16
ENE	.32	.61	12	4
E	.33	.59	3	2
ESE	.31	.62	1	0
SE	.29	.60	0	0
SSE	.27	.62	0	1
S	.32	.63	2	1
SSW	.33	.62	1	6
SW	.32	.58	1	17
WSW	.26	.57	2	8
W	.18	.51	3	2
WNW	.21	.61	46	29
NW	.21	.54	5	6
NNW	.20	.52	0	1
N	.20	.54	0	0

LOCATION 39

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.26	.60	7	7
NE	.33	.62	27	16
ENE	.28	.55	14	3
E	.20	.50	2	1
ESE	.21	.50	0	0
SE	.25	.56	0	0
SSE	.25	.61	0	1
S	.31	.63	5	4
SSW	.31	.59	2	10
SW	.29	.59	7	32
WSW	.20	.52	3	8
W	.17	.51	10	5
WNW	.17	.48	21	10
NW	.14	.36	0	0
NNW	.16	.46	0	1
N	.19	.49	0	0

1993 PHASE I BUILD CONDITION

LOCATION 37

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.62	3	4
NE	.32	.78	47	27
ENE	.28	.65	19	6
E	.22	.58	3	2
ESE	.24	.64	1	0
SE	.27	.71	0	0
SSE	.34	.79	2	3
S	.38	.76	9	10
SSW	.36	.79	16	41
SW	.22	.49	0	4
WSW	.15	.39	0	0
W	.13	.29	0	0
WNW	.13	.30	0	0
NW	.13	.27	0	0
NNW	.14	.35	0	0
N	.16	.43	0	0

LOCATION 38

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.34	.70	11	10
NE	.37	.70	32	19
ENE	.25	.56	9	2
E	.17	.41	0	0
ESE	.23	.73	7	3
SE	.29	.79	2	2
SSE	.36	.75	1	3
S	.35	.71	7	6
SSW	.33	.72	9	25
SW	.22	.49	0	5
WSW	.18	.53	1	5
W	.16	.44	1	0
WNW	.16	.44	3	2
NW	.14	.40	0	0
NNW	.28	.62	9	10
N	.35	.70	8	7

LOCATION 39

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.23	.58	6	6
NE	.26	.56	15	11
ENE	.20	.50	8	1
E	.18	.45	1	0
ESE	.23	.50	0	0
SE	.27	.57	0	0
SSE	.40	.79	4	5
S	.38	.76	19	21
SSW	.27	.65	8	22
SW	.19	.51	1	14
WSW	.15	.41	0	1
W	.17	.46	4	2
WNW	.20	.50	31	15
NW	.16	.42	1	1
NNW	.17	.43	0	0
N	.17	.48	0	0

2000 FULL-BUILD CONDITION

LOCATION 37

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.15	.43	11	11
NE	.13	.32	4	5
ENE	.13	.28	1	0
E	.13	.30	1	0
ESE	.15	.37	0	0
SE	.16	.40	0	0
SSE	.19	.48	2	4
S	.21	.49	12	16
SSW	.16	.41	3	15
SW	.13	.26	0	1
WSW	.13	.26	0	0
W	.14	.37	20	13
WNW	.14	.35	33	20
NW	.14	.33	7	6
NNW	.14	.34	2	3
N	.15	.40	3	4

LOCATION 38

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.14	.33	3	6
NE	.13	.30	6	9
ENE	.16	.37	26	14
E	.18	.40	15	10
ESE	.15	.33	1	0
SE	.13	.27	0	0
SSE	.14	.31	0	1
S	.15	.33	1	2
SSW	.14	.29	0	3
SW	.12	.23	0	2
WSW	.12	.22	0	0
W	.15	.35	30	33
WNW	.14	.29	18	18
NW	.12	.21	0	0
NNW	.12	.23	0	0
N	.12	.24	0	0

LOCATION 39

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.38	0	0
NE	.19	.42	1	3
ENE	.20	.44	2	1
E	.25	.49	1	2
ESE	.25	.54	0	0
SE	.26	.55	0	0
SSE	.23	.57	0	1
S	.19	.48	0	0
SSW	.13	.30	0	0
SW	.13	.27	0	0
WSW	.16	.40	0	1
W	.20	.51	8	10
WNW	.26	.60	81	67
NW	.20	.49	5	10
NNW	.20	.45	0	2
N	.18	.42	0	0

TABLE C-13

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 40

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.25	.57	3	4
NE	.28	.60	18	13
ENE	.28	.56	13	3
E	.22	.52	2	1
ESE	.28	.57	1	0
SE	.30	.57	0	0
SSE	.28	.62	0	1
S	.31	.63	4	3
SSW	.32	.61	2	11
SW	.30	.57	4	25
WSW	.22	.54	4	10
W	.18	.52	10	5
WNW	.19	.54	38	20
NW	.15	.43	1	1
NNW	.16	.44	0	0
N	.18	.48	0	0

LOCATION 41

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.47	0	1
NE	.19	.46	2	3
ENE	.18	.48	3	1
E	.27	.59	5	3
ESE	.33	.61	1	1
SE	.31	.61	0	0
SSE	.26	.57	0	1
S	.27	.57	1	1
SSW	.32	.57	1	7
SW	.28	.52	1	14
WSW	.25	.54	3	10
W	.19	.56	15	12
WNW	.22	.60	65	41
NW	.18	.45	1	2
NNW	.20	.50	1	2
N	.19	.50	0	0

LOCATION 42

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.22	.55	1	1
NE	.28	.61	10	10
ENE	.31	.63	14	4
E	.33	.64	5	3
ESE	.31	.65	1	0
SE	.29	.63	0	0
SSE	.22	.59	0	1
S	.27	.61	1	1
SSW	.35	.68	2	13
SW	.30	.60	1	18
WSW	.26	.60	3	11
W	.19	.59	12	8
WNW	.23	.62	48	29
NW	.16	.44	0	0
NNW	.18	.50	0	1
N	.20	.53	0	0

1993 PHASE I BUILD CONDITION

LOCATION 40

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.24	.56	2	2
NE	.23	.51	4	4
ENE	.20	.49	3	0
E	.19	.45	0	0
ESE	.25	.50	0	0
SE	.29	.58	0	0
SSE	.40	.80	2	4
S	.40	.79	14	14
SSW	.36	.79	22	42
SW	.22	.50	0	5
WSW	.17	.52	1	4
W	.14	.41	0	0
WNW	.21	.58	46	21
NW	.20	.51	5	3
NNW	.17	.43	0	0
N	.18	.51	0	0

LOCATION 41

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.51	2	2
NE	.16	.42	1	2
ENE	.16	.42	2	0
E	.23	.50	2	1
ESE	.25	.50	0	0
SE	.26	.50	0	0
SSE	.27	.62	1	2
S	.31	.61	5	4
SSW	.26	.56	1	8
SW	.20	.49	1	11
WSW	.21	.61	14	29
W	.15	.47	6	3
WNW	.21	.55	58	30
NW	.20	.46	4	3
NNW	.21	.51	3	4
N	.21	.49	0	0

LOCATION 42

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.21	.52	2	3
NE	.23	.53	10	8
ENE	.24	.56	15	4
E	.21	.51	2	1
ESE	.21	.47	0	0
SE	.22	.48	0	0
SSE	.22	.57	0	1
S	.33	.65	7	6
SSW	.28	.59	2	11
SW	.18	.50	1	11
WSW	.19	.61	14	28
W	.15	.45	3	1
WNW	.19	.53	42	22
NW	.16	.38	0	0
NNW	.19	.48	1	2
N	.20	.53	1	1

2000 FULL-BUILD CONDITION

LOCATION 40

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.15	.40	3	8
NE	.14	.30	1	4
ENE	.19	.50	45	31
E	.27	.56	35	22
ESE	.20	.50	7	11
SE	.15	.39	0	0
SSE	.14	.31	0	0
S	.13	.27	0	0
SSW	.13	.23	0	0
SW	.12	.23	0	0
WSW	.12	.24	0	0
W	.13	.25	0	0
WNW	.13	.25	0	1
NW	.13	.30	1	2
NNW	.15	.37	3	10
N	.16	.42	3	7

LOCATION 41

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.26	.53	5	7
NE	.26	.48	9	9
ENE	.20	.46	7	2
E	.22	.48	3	2
ESE	.32	.63	8	6
SE	.39	.74	4	8
SSE	.34	.70	3	6
S	.27	.70	18	27
SSW	.15	.40	0	1
SW	.13	.31	0	0
WSW	.14	.31	0	0
W	.16	.48	14	10
WNW	.17	.46	27	18
NW	.16	.37	1	1
NNW	.18	.41	0	1
N	.22	.48	1	1

LOCATION 42

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.23	.52	4	4
NE	.23	.52	13	10
ENE	.20	.56	23	6
E	.17	.50	4	2
ESE	.28	.71	17	11
SE	.38	.72	3	3
SSE	.37	.73	4	5
S	.41	.70	16	18
SSW	.32	.59	5	17
SW	.23	.51	3	21
WSW	.15	.37	0	0
W	.14	.36	0	0
WNW	.15	.41	8	4
NW	.17	.29	0	0
NNW	.14	.30	0	0
N	.17	.39	0	0

TABLE C-14

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 43

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.31	.63	4	5
NE	.34	.65	19	15
ENE	.36	.65	21	7
E	.32	.60	4	2
ESE	.28	.56	0	0
SE	.30	.60	0	0
SSE	.24	.62	0	1
S	.27	.60	1	1
SSW	.33	.62	1	8
SW	.31	.58	1	18
WSW	.30	.60	4	13
W	.18	.50	3	2
WNW	.19	.56	29	18
NW	.22	.56	11	9
NNW	.19	.50	0	1
N	.20	.54	0	0

LOCATION 44

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.29	.60	3	4
NE	.34	.66	22	16
ENE	.34	.64	20	7
E	.28	.60	4	2
ESE	.26	.55	0	0
SE	.29	.62	0	0
SSE	.23	.58	0	1
S	.28	.58	1	1
SSW	.31	.59	1	6
SW	.30	.57	1	17
WSW	.30	.62	7	18
W	.20	.53	7	4
WNW	.17	.53	21	13
NW	.22	.55	10	8
NNW	.19	.50	0	1
N	.22	.56	1	1

LOCATION 45

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.27	.59	5	5
NE	.34	.62	22	15
ENE	.34	.62	23	7
E	.30	.60	7	3
ESE	.25	.54	0	0
SE	.22	.60	0	0
SSE	.23	.60	0	1
S	.25	.57	2	1
SSW	.29	.57	1	5
SW	.28	.57	3	23
WSW	.29	.60	9	20
W	.20	.52	10	5
WNW	.15	.43	5	3
NW	.19	.51	10	7
NNW	.18	.51	1	2
N	.24	.56	2	2

1993 PHASE I BUILD CONDITION

LOCATION 43

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.33	.63	10	11
NE	.32	.59	18	14
ENE	.28	.54	12	4
E	.21	.49	1	1
ESE	.15	.42	0	0
SE	.18	.45	0	0
SSE	.23	.56	0	1
S	.28	.61	4	4
SSW	.22	.53	0	5
SW	.17	.44	0	4
WSW	.17	.48	1	5
W	.14	.42	1	1
WNW	.15	.47	14	10
NW	.16	.41	0	1
NNW	.25	.64	24	26
N	.32	.70	14	14

LOCATION 44

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.25	.60	15	16
NE	.21	.56	28	21
ENE	.19	.49	13	5
E	.17	.42	1	1
ESE	.14	.35	0	0
SE	.17	.49	0	0
SSE	.17	.48	0	1
S	.20	.50	2	2
SSW	.17	.43	0	2
SW	.14	.37	0	3
WSW	.14	.43	1	6
W	.14	.37	1	1
WNW	.15	.43	20	15
NW	.13	.34	0	0
NNW	.15	.50	7	12
N	.22	.60	11	13

LOCATION 45

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.51	8	9
NE	.25	.55	37	23
ENE	.23	.49	21	7
E	.16	.38	1	1
ESE	.14	.39	0	0
SE	.15	.44	0	0
SSE	.21	.55	1	3
S	.24	.53	5	6
SSW	.22	.52	4	18
SW	.14	.39	0	8
WSW	.15	.42	2	8
W	.15	.35	1	1
WNW	.14	.40	17	11
NW	.13	.32	0	0
NNW	.13	.35	0	0
N	.14	.42	1	1

2000 FULL-BUILD CONDITION

LOCATION 43

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.27	.64	16	17
NE	.25	.65	41	27
ENE	.18	.52	13	5
E	.19	.56	8	5
ESE	.23	.62	4	3
SE	.26	.60	0	1
SSE	.27	.60	1	2
S	.27	.54	2	2
SSW	.20	.49	0	4
SW	.18	.46	0	13
WSW	.13	.38	0	1
W	.12	.29	0	0
WNW	.12	.25	0	0
NW	.13	.25	0	0
NNW	.12	.41	0	1
N	.21	.66	14	16

LOCATION 44

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.12	.26	1	2
NE	.12	.24	4	5
ENE	.13	.31	22	7
E	.14	.34	17	8
ESE	.14	.35	8	5
SE	.15	.40	3	4
SSE	.15	.38	2	4
S	.15	.37	13	15
SSW	.14	.31	2	12
SW	.12	.28	2	21
WSW	.11	.23	1	3
W	.11	.24	5	2
WNW	.11	.21	4	3
NW	.11	.22	2	2
NNW	.12	.25	1	2
N	.13	.30	3	3

LOCATION 45

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.13	.30	0	0
NE	.14	.38	1	3
ENE	.28	.55	25	11
E	.37	.69	35	18
ESE	.36	.72	24	27
SE	.32	.73	4	9
SSE	.25	.67	2	5
S	.23	.60	7	11
SSW	.20	.53	2	13
SW	.15	.38	0	4
WSW	.14	.36	0	1
W	.12	.29	0	0
WNW	.12	.26	0	0
NW	.12	.28	0	0
NNW	.12	.26	0	0
N	.13	.30	0	0

TABLE C-15

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 46

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.26	.59	3	3
NE	.36	.64	18	13
ENE	.36	.64	20	5
E	.30	.59	4	2
ESE	.29	.59	1	0
SE	.19	.59	0	0
SSE	.23	.62	0	1
S	.27	.57	1	0
SSW	.32	.59	0	4
SW	.32	.59	2	19
WSW	.33	.68	15	30
W	.24	.59	16	9
WNW	.17	.50	13	7
NW	.16	.49	3	2
NNW	.22	.55	2	3
N	.23	.56	1	1

LOCATION 47

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.27	.57	2	3
NE	.35	.61	16	11
ENE	.35	.60	16	4
E	.30	.57	4	2
ESE	.33	.65	2	1
SE	.20	.58	0	0
SSE	.23	.54	0	0
S	.29	.55	1	0
SSW	.32	.58	1	4
SW	.31	.59	3	21
WSW	.32	.66	13	26
W	.25	.60	24	13
WNW	.16	.47	8	4
NW	.16	.49	4	3
NNW	.22	.57	4	5
N	.22	.54	1	1

LOCATION 48

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.28	.59	3	3
NE	.36	.63	17	12
ENE	.36	.62	16	4
E	.33	.64	7	3
ESE	.32	.68	3	1
SE	.18	.57	0	0
SSE	.19	.54	0	0
S	.27	.57	1	0
SSW	.33	.62	1	6
SW	.33	.60	3	22
WSW	.32	.66	12	24
W	.23	.61	22	12
WNW	.16	.49	9	5
NW	.15	.50	3	2
NNW	.21	.55	2	3
N	.22	.58	1	1

1993 PHASE I BUILD CONDITION

LOCATION 46

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.49	7	7
NE	.27	.51	25	17
ENE	.25	.49	23	7
E	.17	.42	2	1
ESE	.16	.41	0	0
SE	.19	.54	1	0
SSE	.20	.51	1	2
S	.23	.49	3	3
SSW	.22	.49	3	12
SW	.19	.41	1	11
WSW	.18	.46	6	15
W	.16	.43	12	7
WNW	.14	.36	7	5
NW	.13	.30	0	0
NNW	.17	.44	4	5
N	.17	.51	6	5

LOCATION 47

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.20	.58	6	8
NE	.16	.39	0	2
ENE	.15	.37	0	0
E	.16	.42	0	0
ESE	.17	.43	0	0
SE	.18	.56	0	0
SSE	.16	.41	0	0
S	.17	.40	0	0
SSW	.15	.38	0	0
SW	.21	.46	0	9
WSW	.20	.52	4	13
W	.20	.54	20	17
WNW	.20	.56	63	42
NW	.13	.33	0	0
NNW	.17	.44	0	1
N	.20	.62	6	7

LOCATION 48

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.22	.54	3	4
NE	.26	.53	10	9
ENE	.22	.51	9	2
E	.18	.43	1	0
ESE	.23	.52	0	0
SE	.16	.42	0	0
SSE	.15	.42	0	0
S	.21	.50	1	0
SSW	.27	.54	1	6
SW	.24	.53	2	21
WSW	.24	.52	4	12
W	.18	.46	4	2
WNW	.18	.54	55	31
NW	.13	.33	0	0
NNW	.17	.50	2	4
N	.23	.63	7	7

2000 FULL-BUILD CONDITION

LOCATION 46

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.37	0	0
NE	.16	.41	2	4
ENE	.26	.57	27	12
E	.27	.69	31	16
ESE	.29	.73	22	25
SE	.25	.67	2	3
SSE	.34	.72	4	6
S	.34	.63	9	14
SSW	.24	.54	2	14
SW	.15	.41	0	5
WSW	.13	.30	0	0
W	.13	.29	0	0
WNW	.13	.29	0	0
NW	.12	.25	0	0
NNW	.15	.35	0	0
N	.16	.37	0	0

LOCATION 47

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.13	.29	5	4
NE	.13	.24	4	4
ENE	.13	.28	14	3
E	.13	.32	12	4
ESE	.14	.36	11	5
SE	.15	.38	2	2
SSE	.15	.37	2	3
S	.15	.34	9	7
SSW	.14	.32	6	15
SW	.13	.31	11	36
WSW	.12	.27	4	8
W	.11	.21	1	0
WNW	.12	.22	9	3
NW	.11	.22	1	1
NNW	.12	.22	0	0
N	.12	.25	1	0

LOCATION 48

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.45	1	2
NE	.18	.50	13	11
ENE	.24	.54	24	8
E	.26	.59	15	7
ESE	.29	.69	19	14
SE	.22	.61	1	1
SSE	.19	.55	0	2
S	.21	.49	2	1
SSW	.25	.52	2	9
SW	.20	.47	1	16
WSW	.20	.54	11	24
W	.15	.36	1	0
WNW	.15	.38	5	3
NW	.14	.39	1	1
NNW	.14	.33	0	0
N	.16	.46	1	1

TABLE C-16

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 49

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.28	.60	4	4
NE	.35	.64	21	13
ENE	.36	.63	20	5
E	.30	.57	3	2
ESE	.28	.60	1	0
SE	.21	.64	0	0
SSE	.23	.62	0	1
S	.26	.64	3	2
SSW	.32	.61	1	6
SW	.32	.60	4	23
WSW	.33	.67	14	27
W	.23	.57	14	7
WNW	.17	.46	7	3
NW	.18	.47	2	1
NNW	.20	.56	3	4
N	.23	.55	1	1

LOCATION 50

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.31	.60	3	3
NE	.36	.65	18	13
ENE	.35	.66	21	6
E	.34	.61	4	2
ESE	.30	.59	0	0
SE	.30	.61	0	0
SSE	.21	.58	0	1
S	.26	.61	1	1
SSW	.35	.63	1	7
SW	.33	.61	2	21
WSW	.33	.63	7	17
W	.23	.59	14	8
WNW	.19	.54	20	11
NW	.23	.55	8	6
NNW	.20	.50	0	1
N	.20	.55	0	0

LOCATION 51

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.32	.79	7	11
NE	.39	.83	28	24
ENE	.39	.78	22	12
E	.34	.71	4	3
ESE	.22	.57	0	0
SE	.23	.59	0	0
SSE	.31	.68	0	1
S	.33	.73	2	3
SSW	.20	.51	0	0
SW	.22	.51	0	2
WSW	.16	.40	0	0
W	.19	.52	0	1
WNW	.31	.66	29	27
NW	.28	.63	6	10
NNW	.19	.53	0	0
N	.32	.72	2	3

1993 PHASE I BUILD CONDITION

LOCATION 49

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.23	.51	5	4
NE	.28	.53	19	12
ENE	.24	.50	15	3
E	.17	.41	1	0
ESE	.16	.38	0	0
SE	.17	.47	0	0
SSE	.22	.57	1	2
S	.25	.55	4	2
SSW	.26	.57	5	15
SW	.22	.54	9	34
WSW	.22	.51	7	13
W	.17	.44	8	3
WNW	.16	.44	23	10
NW	.14	.35	0	0
NNW	.16	.41	0	1
N	.17	.50	2	1

LOCATION 50

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.32	.63	9	10
NE	.36	.66	34	22
ENE	.31	.61	23	8
E	.23	.49	1	1
ESE	.16	.40	0	0
SE	.17	.44	0	0
SSE	.24	.56	0	1
S	.29	.64	5	5
SSW	.27	.55	1	5
SW	.21	.53	2	19
WSW	.19	.48	1	5
W	.15	.39	0	0
WNW	.16	.45	9	6
NW	.15	.46	3	3
NNW	.20	.56	7	9
N	.25	.61	4	4

LOCATION 51

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.28	.68	4	8
NE	.37	.76	28	25
ENE	.33	.71	21	12
E	.33	.66	4	4
ESE	.20	.50	0	0
SE	.17	.46	0	0
SSE	.20	.55	0	0
S	.19	.50	0	0
SSW	.19	.51	0	1
SW	.21	.47	0	2
WSW	.18	.44	0	1
W	.19	.48	1	1
WNW	.30	.64	39	36
NW	.21	.54	2	5
NNW	.19	.55	0	2
N	.29	.62	1	2

2000 FULL-BUILD CONDITION

LOCATION 49

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.19	.57	15	11
NE	.17	.42	5	5
ENE	.23	.48	15	3
E	.23	.51	8	3
ESE	.21	.58	7	2
SE	.27	.68	4	4
SSE	.27	.70	5	6
S	.25	.57	7	6
SSW	.23	.55	5	16
SW	.19	.48	4	21
WSW	.15	.39	1	2
W	.15	.36	1	0
WNW	.15	.33	2	1
NW	.14	.32	0	0
NNW	.19	.49	9	9
N	.19	.58	12	9

LOCATION 50

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.16	.41	1	1
NE	.17	.47	9	8
ENE	.31	.57	34	11
E	.23	.50	5	2
ESE	.16	.44	0	0
SE	.17	.50	0	0
SSE	.28	.64	2	3
S	.26	.57	6	5
SSW	.25	.54	3	11
SW	.21	.48	3	19
WSW	.17	.54	13	25
W	.14	.42	5	2
WNW	.14	.35	3	2
NW	.13	.31	0	0
NNW	.16	.45	2	3
N	.21	.60	11	9

LOCATION 51

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT SPR	WEIGHT SUM
NNE	.28	.69	4	8
NE	.38	.80	37	29
ENE	.26	.65	11	6
E	.31	.64	3	3
ESE	.20	.56	0	0
SE	.17	.40	0	0
SSE	.16	.41	0	0
S	.19	.49	0	0
SSW	.19	.47	0	0
SW	.21	.47	0	3
WSW	.17	.43	0	0
W	.19	.50	1	1
WNW	.29	.63	36	33
NW	.22	.58	7	11
NNW	.19	.52	0	1
N	.28	.62	1	2

TABLE C-17

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 1

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.27	.66	18	16
NE	.20	.53	19	12
ENE	.19	.49	11	11
E	.21	.62	14	13
ESE	.20	.58	4	2
SE	.34	.82	12	8
SSE	.25	.73	4	5
S	.20	.64	10	10
SSW	.15	.42	0	0
SW	.14	.34	0	0
WSW	.17	.45	1	1
W	.15	.34	0	0
WNW	.14	.32	0	0
NW	.14	.33	1	0
NNW	.16	.38	0	0
N	.21	.58	5	21

LOCATION 2

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.29	.59	10	8
NE	.22	.46	8	4
ENE	.30	.53	16	14
E	.36	.58	9	7
ESE	.37	.63	7	3
SE	.33	.69	5	2
SSE	.30	.75	5	5
S	.24	.66	12	10
SSW	.23	.52	3	2
SW	.21	.43	1	1
WSW	.19	.42	0	0
W	.18	.37	0	0
WNW	.19	.42	7	12
NW	.18	.40	6	4
NNW	.19	.43	1	1
N	.26	.62	8	25

LOCATION 3

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.18	.47	1	0
NE	.24	.59	18	8
ENE	.30	.65	25	18
E	.30	.55	3	2
ESE	.30	.55	2	0
SE	.26	.57	1	0
SSE	.28	.55	0	0
S	.20	.49	1	0
SSW	.20	.51	1	0
SW	.17	.44	0	0
WSW	.18	.48	0	0
W	.17	.47	2	2
WNW	.17	.39	1	0
NW	.16	.36	1	0
NNW	.17	.48	1	1
N	.36	.87	42	66

1993 PHASE I BUILD CONDITION

LOCATION 1

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.27	.60	14	10
NE	.16	.44	8	4
ENE	.16	.45	8	7
E	.20	.40	1	0
ESE	.23	.55	4	1
SE	.35	.79	12	7
SSE	.32	.79	7	7
S	.23	.58	7	6
SSW	.19	.47	2	1
SW	.17	.40	1	0
WSW	.18	.47	3	2
W	.14	.32	0	0
WNW	.14	.30	0	0
NW	.21	.44	15	15
NNW	.24	.51	7	10
N	.24	.61	10	28

LOCATION 2

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.23	.52	7	4
NE	.18	.41	6	2
ENE	.18	.39	4	3
E	.22	.39	1	0
ESE	.22	.47	2	0
SE	.27	.53	1	0
SSE	.26	.57	1	1
S	.24	.58	8	6
SSW	.23	.50	4	2
SW	.23	.52	16	9
WSW	.20	.45	2	1
W	.19	.39	1	2
WNW	.17	.38	4	5
NW	.21	.43	14	12
NNW	.26	.55	18	22
N	.25	.59	10	26

LOCATION 3

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.18	.50	0	0
NE	.21	.46	0	0
ENE	.28	.63	6	3
E	.20	.49	0	0
ESE	.26	.65	1	0
SE	.29	.66	0	0
SSE	.28	.62	0	0
S	.22	.60	0	0
SSW	.21	.51	0	0
SW	.18	.46	0	0
WSW	.18	.45	0	0
W	.21	.56	1	0
WNW	.26	.64	11	12
NW	.34	.79	43	47
NNW	.44	.93	36	35
N	.25	.71	1	3

2000 FULL-BUILD CONDITION

LOCATION 1

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.27	.65	18	14
NE	.15	.42	5	2
ENE	.17	.44	6	6
E	.18	.43	1	1
ESE	.22	.53	3	1
SE	.37	.85	15	9
SSE	.32	.79	6	7
S	.23	.62	9	8
SSW	.20	.47	1	1
SW	.18	.41	1	0
WSW	.18	.45	1	1
W	.14	.33	0	0
WNW	.14	.32	0	0
NW	.22	.46	16	17
NNW	.24	.54	10	14
N	.24	.60	6	21

LOCATION 2

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.25	.55	7	5
NE	.19	.39	3	1
ENE	.20	.44	7	6
E	.21	.41	1	0
ESE	.26	.52	3	1
SE	.28	.53	1	0
SSE	.26	.57	1	1
S	.24	.57	6	5
SSW	.24	.53	5	2
SW	.24	.53	15	9
WSW	.20	.45	1	1
W	.19	.38	1	1
WNW	.18	.37	2	3
NW	.21	.47	20	21
NNW	.26	.58	21	27
N	.24	.58	6	19

LOCATION 3

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.18	.46	0	0
NE	.18	.38	0	0
ENE	.24	.50	1	0
E	.20	.52	0	0
ESE	.22	.57	0	0
SE	.19	.45	0	0
SSE	.22	.51	0	0
S	.25	.61	0	0
SSW	.21	.52	0	0
SW	.24	.61	1	0
WSW	.18	.43	0	0
W	.21	.57	1	0
WNW	.26	.65	10	9
NW	.37	.85	58	66
NNW	.43	.90	28	23
N	.23	.69	0	2

TABLE C-18

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 4

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.61	3	3
NE	.31	.71	24	16
ENE	.37	.74	26	26
E	.44	.77	13	14
ESE	.34	.68	3	1
SE	.23	.61	0	0
SSE	.25	.70	1	1
S	.31	.71	5	6
SSW	.35	.73	8	7
SW	.29	.63	7	6
WSW	.27	.62	3	4
W	.23	.58	5	13
WNW	.16	.37	0	0
NW	.17	.42	1	0
NNW	.16	.38	0	0
N	.20	.53	0	2

LOCATION 5

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.29	.66	4	4
NE	.34	.70	20	13
ENE	.32	.74	24	23
E	.21	.62	3	2
ESE	.21	.67	2	1
SE	.25	.64	0	0
SSE	.37	.70	1	1
S	.37	.71	4	4
SSW	.36	.81	14	11
SW	.28	.71	16	15
WSW	.19	.57	1	1
W	.17	.51	1	2
WNW	.17	.41	0	0
NW	.21	.48	3	2
NNW	.28	.65	5	9
N	.32	.68	2	12

LOCATION 6

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.25	.63	6	5
NE	.30	.69	29	19
ENE	.21	.53	8	8
E	.22	.54	2	2
ESE	.26	.62	3	1
SE	.25	.71	2	1
SSE	.20	.54	0	0
S	.20	.56	1	2
SSW	.30	.74	16	12
SW	.24	.64	16	14
WSW	.16	.40	0	0
W	.15	.35	0	0
WNW	.16	.41	1	2
NW	.19	.47	6	6
NNW	.27	.61	7	14
N	.32	.63	2	14

1993 PHASE I BUILD CONDITION

LOCATION 4

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.21	.53	0	0
NE	.29	.63	6	2
ENE	.42	.84	24	19
E	.42	.77	5	3
ESE	.32	.67	1	0
SE	.22	.45	0	0
SSE	.26	.52	0	0
S	.30	.58	0	0
SSW	.32	.65	1	0
SW	.29	.62	1	0
WSW	.28	.62	0	0
W	.26	.59	1	1
WNW	.26	.69	19	29
NW	.31	.75	32	37
NNW	.36	.75	7	7
N	.24	.59	0	1

LOCATION 5

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.28	.62	1	0
NE	.31	.66	8	3
ENE	.30	.79	19	14
E	.31	.79	6	4
ESE	.24	.63	1	0
SE	.20	.57	0	0
SSE	.26	.63	0	0
S	.24	.58	0	0
SSW	.26	.67	1	0
SW	.27	.63	2	1
WSW	.22	.58	0	0
W	.27	.64	4	4
WNW	.27	.69	21	31
NW	.28	.75	34	39
NNW	.26	.66	1	1
N	.31	.64	0	1

LOCATION 6

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.51	1	0
NE	.21	.60	14	6
ENE	.21	.63	16	13
E	.20	.56	2	1
ESE	.23	.57	1	0
SE	.22	.62	1	0
SSE	.31	.78	2	2
S	.31	.75	8	6
SSW	.23	.60	2	1
SW	.22	.56	3	1
WSW	.19	.48	0	0
W	.22	.56	5	7
WNW	.21	.57	19	33
NW	.21	.58	21	22
NNW	.22	.60	4	5
N	.20	.49	0	1

2000 FULL-BUILD CONDITION

LOCATION 4

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.22	.54	0	0
NE	.27	.55	3	1
ENE	.38	.81	23	17
E	.35	.74	5	3
ESE	.28	.62	1	0
SE	.18	.39	0	0
SSE	.22	.45	0	0
S	.28	.54	0	0
SSW	.31	.63	1	0
SW	.29	.60	1	0
WSW	.27	.64	1	0
W	.25	.60	2	1
WNW	.25	.66	16	20
NW	.34	.78	43	52
NNW	.34	.73	6	5
N	.23	.57	0	0

LOCATION 5

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.27	.62	1	0
NE	.32	.68	9	3
ENE	.34	.79	17	12
E	.28	.69	2	1
ESE	.23	.64	1	0
SE	.16	.37	0	0
SSE	.21	.53	0	0
S	.25	.64	1	0
SSW	.24	.65	1	0
SW	.24	.60	1	0
WSW	.22	.59	0	0
W	.28	.64	3	2
WNW	.25	.67	14	16
NW	.30	.83	51	64
NNW	.26	.62	0	0
N	.29	.63	0	1

LOCATION 6

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.53	1	0
NE	.24	.65	16	7
ENE	.28	.64	13	10
E	.20	.53	1	0
ESE	.18	.45	0	0
SE	.17	.42	0	0
SSE	.23	.58	0	0
S	.32	.78	8	6
SSW	.22	.58	1	0
SW	.20	.52	1	0
WSW	.18	.47	0	0
W	.22	.56	4	3
WNW	.21	.55	9	11
NW	.23	.70	47	62
NNW	.19	.49	0	0
N	.19	.47	0	0

TABLE C-19

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 7

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.57	5	5
NE	.25	.66	33	22
ENE	.22	.57	17	16
E	.16	.42	0	0
ESE	.17	.47	1	0
SE	.25	.57	1	0
SSE	.31	.61	1	1
S	.28	.58	4	4
SSW	.29	.63	9	7
SW	.20	.55	9	7
WSW	.15	.39	0	0
W	.14	.39	0	0
WNW	.15	.47	11	26
NW	.17	.44	7	7
NNW	.14	.36	0	0
N	.17	.52	1	5

LOCATION 8

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.15	.35	0	0
NE	.20	.46	8	5
ENE	.29	.58	22	22
E	.28	.62	12	13
ESE	.26	.63	6	4
SE	.22	.65	3	2
SSE	.31	.65	2	3
S	.33	.59	6	6
SSW	.33	.66	18	13
SW	.24	.54	12	11
WSW	.18	.46	1	2
W	.17	.48	7	16
WNW	.15	.36	1	2
NW	.15	.31	0	0
NNW	.16	.34	0	0
N	.15	.31	0	0

LOCATION 9

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.17	.43	0	0
NE	.20	.54	9	5
ENE	.34	.67	25	22
E	.35	.69	11	10
ESE	.37	.75	8	4
SE	.37	.88	8	5
SSE	.24	.75	2	2
S	.21	.60	3	3
SSW	.23	.57	2	1
SW	.20	.55	4	3
WSW	.20	.59	5	5
W	.16	.46	1	1
WNW	.19	.53	15	33
NW	.18	.43	3	1
NNW	.23	.55	3	4
N	.17	.40	0	0

1993 PHASE I BUILD CONDITION

LOCATION 7

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.49	1	0
NE	.27	.70	28	16
ENE	.34	.73	30	26
E	.21	.54	2	1
ESE	.19	.45	0	0
SE	.20	.48	0	0
SSE	.22	.60	0	0
S	.18	.47	0	0
SSW	.18	.45	0	0
SW	.17	.43	0	0
WSW	.17	.44	0	0
W	.21	.54	4	6
WNW	.18	.51	8	14
NW	.22	.59	25	32
NNW	.20	.52	1	1
N	.21	.50	0	1

LOCATION 8

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.14	.31	0	0
NE	.19	.44	13	6
ENE	.26	.51	23	19
E	.24	.54	12	10
ESE	.24	.55	6	2
SE	.23	.60	4	2
SSE	.23	.53	1	1
S	.18	.41	1	1
SSW	.16	.35	0	0
SW	.15	.35	0	0
WSW	.17	.44	3	2
W	.19	.46	16	25
WNW	.17	.40	15	27
NW	.15	.34	4	1
NNW	.15	.31	0	0
N	.14	.28	0	0

LOCATION 9

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.41	0	0
NE	.18	.48	8	4
ENE	.30	.55	15	13
E	.34	.65	12	10
ESE	.37	.76	11	7
SE	.35	.76	6	3
SSE	.29	.75	3	3
S	.21	.62	6	5
SSW	.16	.44	0	0
SW	.15	.43	1	0
WSW	.20	.58	9	8
W	.16	.41	1	1
WNW	.18	.50	18	37
NW	.20	.42	5	2
NNW	.23	.52	3	5
N	.16	.38	0	0

2000 FULL-BUILD CONDITION

LOCATION 7

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.48	1	0
NE	.20	.50	6	1
ENE	.17	.41	1	0
E	.16	.36	0	0
ESE	.18	.45	0	0
SE	.19	.46	0	0
SSE	.14	.30	0	0
S	.15	.36	0	0
SSW	.17	.41	0	0
SW	.16	.45	0	0
WSW	.17	.44	0	0
W	.22	.53	5	3
WNW	.19	.55	21	20
NW	.23	.69	65	74
NNW	.17	.47	0	0
N	.21	.52	0	1

LOCATION 8

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.23	.50	6	3
NE	.29	.53	24	13
ENE	.26	.47	12	10
E	.27	.50	6	4
ESE	.29	.49	3	0
SE	.23	.44	0	0
SSE	.20	.42	0	0
S	.15	.34	0	0
SSW	.16	.36	0	0
SW	.17	.42	2	1
WSW	.16	.40	1	0
W	.20	.45	8	11
WNW	.19	.46	26	47
NW	.17	.41	12	9
NNW	.17	.37	0	0
N	.16	.33	0	0

LOCATION 9

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.47	2	1
NE	.27	.57	25	14
ENE	.29	.55	20	17
E	.26	.49	3	2
ESE	.21	.40	0	0
SE	.22	.52	1	0
SSE	.19	.48	0	0
S	.15	.39	0	0
SSW	.15	.41	0	0
SW	.16	.46	3	1
WSW	.20	.57	14	13
W	.17	.42	2	2
WNW	.18	.47	19	39
NW	.17	.41	7	5
NNW	.19	.44	1	2
N	.15	.38	0	0

TABLE C-20

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 10

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.55	3	2
NE	.29	.65	28	15
ENE	.31	.62	20	17
E	.24	.53	2	1
ESE	.21	.51	1	0
SE	.21	.49	0	0
SSE	.23	.54	0	0
S	.27	.54	2	1
SSW	.27	.55	2	1
SW	.24	.55	6	3
WSW	.19	.57	4	3
W	.17	.47	2	2
WNW	.18	.55	28	52
NW	.15	.37	1	0
NNW	.15	.38	0	0
N	.17	.48	0	1

LOCATION 11

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.18	.47	1	1
NE	.27	.61	26	16
ENE	.30	.60	22	20
E	.26	.54	4	4
ESE	.23	.52	2	0
SE	.24	.50	0	0
SSE	.27	.58	1	1
S	.31	.56	3	3
SSW	.30	.57	5	3
SW	.26	.56	12	9
WSW	.19	.55	5	6
W	.17	.48	4	7
WNW	.17	.48	13	30
NW	.15	.35	1	0
NNW	.15	.33	0	0
N	.15	.36	0	0

LOCATION 12

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.17	.42	0	0
NE	.26	.58	20	11
ENE	.31	.58	18	16
E	.28	.56	5	4
ESE	.27	.55	2	0
SE	.27	.53	0	0
SSE	.30	.62	1	1
S	.32	.58	3	3
SSW	.32	.59	6	4
SW	.28	.55	10	7
WSW	.20	.54	4	4
W	.18	.48	5	7
WNW	.17	.50	18	37
NW	.16	.42	5	3
NNW	.15	.36	0	0
N	.14	.33	0	0

1993 PHASE I BUILD CONDITION

LOCATION 10

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.18	.51	3	1
NE	.21	.52	15	6
ENE	.22	.53	15	11
E	.20	.51	3	2
ESE	.21	.49	1	0
SE	.23	.54	1	0
SSE	.28	.64	2	1
S	.23	.66	10	7
SSW	.16	.41	0	0
SW	.15	.34	0	0
WSW	.17	.52	4	2
W	.17	.46	3	3
WNW	.18	.53	38	63
NW	.17	.40	5	2
NNW	.16	.35	0	0
N	.15	.38	0	0

LOCATION 11

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.42	1	1
NE	.20	.49	16	8
ENE	.21	.49	15	12
E	.22	.50	5	3
ESE	.26	.52	3	1
SE	.28	.64	4	2
SSE	.28	.68	4	4
S	.20	.59	8	7
SSW	.16	.35	0	0
SW	.15	.33	0	0
WSW	.17	.49	6	4
W	.18	.43	4	6
WNW	.19	.47	26	49
NW	.17	.38	6	3
NNW	.15	.34	0	0
N	.15	.34	0	0

LOCATION 12

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.17	.43	1	0
NE	.19	.45	7	2
ENE	.22	.49	10	7
E	.25	.51	4	2
ESE	.30	.61	5	1
SE	.33	.72	5	2
SSE	.22	.64	2	1
S	.19	.50	2	1
SSW	.16	.35	0	0
SW	.15	.33	0	0
WSW	.17	.42	0	0
W	.18	.46	5	4
WNW	.22	.53	40	63
NW	.24	.48	19	15
NNW	.22	.44	1	1
N	.21	.46	0	2

2000 FULL-BUILD CONDITION

LOCATION 10

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.18	.52	4	1
NE	.17	.36	1	0
ENE	.19	.46	7	4
E	.23	.49	3	1
ESE	.20	.49	1	0
SE	.21	.50	0	0
SSE	.21	.56	1	0
S	.16	.43	0	0
SSW	.14	.28	0	0
SW	.15	.33	0	0
WSW	.17	.49	2	1
W	.17	.43	2	1
WNW	.21	.56	54	75
NW	.19	.48	19	11
NNW	.19	.50	4	2
N	.19	.49	0	2

LOCATION 11

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.48	1	0
NE	.24	.48	5	1
ENE	.25	.46	4	2
E	.27	.49	1	0
ESE	.29	.50	1	0
SE	.22	.44	0	0
SSE	.23	.50	0	0
S	.16	.36	0	0
SSW	.14	.28	0	0
SW	.15	.29	0	0
WSW	.19	.47	0	0
W	.22	.53	6	4
WNW	.26	.63	63	83
NW	.23	.53	18	9
NNW	.21	.48	1	0
N	.18	.48	0	1

LOCATION 12

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.41	1	0
NE	.14	.33	2	0
ENE	.13	.26	0	0
E	.15	.32	0	0
ESE	.13	.28	0	0
SE	.13	.26	0	0
SSE	.12	.23	0	0
S	.12	.25	0	0
SSW	.12	.25	0	0
SW	.13	.26	0	0
WSW	.14	.33	0	0
W	.16	.43	5	3
WNW	.18	.50	50	64
NW	.18	.48	34	27
NNW	.18	.49	8	5
N	.16	.41	0	1

TABLE C-21

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 13

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.27	.62	6	4
NE	.27	.58	15	8
ENE	.29	.57	13	11
E	.25	.53	2	1
ESE	.23	.53	1	0
SE	.26	.57	0	0
SSE	.31	.62	1	1
S	.33	.62	4	3
SSW	.34	.66	9	5
SW	.29	.62	16	10
WSW	.20	.50	1	0
W	.17	.45	1	1
WNW	.18	.50	10	19
NW	.19	.53	18	19
NNW	.15	.39	0	0
N	.24	.64	4	15

LOCATION 14

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.56	3	2
NE	.24	.57	14	8
ENE	.28	.57	13	12
E	.24	.53	2	2
ESE	.20	.48	1	0
SE	.20	.52	0	0
SSE	.24	.52	0	0
S	.29	.56	2	2
SSW	.33	.70	14	9
SW	.28	.64	21	15
WSW	.22	.61	8	8
W	.19	.58	14	27
WNW	.15	.35	0	0
NW	.16	.41	2	1
NNW	.21	.57	5	7
N	.22	.56	1	7

LOCATION 15

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.21	.60	4	2
NE	.22	.61	16	8
ENE	.25	.61	15	12
E	.19	.51	1	1
ESE	.18	.42	0	0
SE	.20	.48	0	0
SSE	.18	.46	0	0
S	.23	.56	1	1
SSW	.25	.69	9	5
SW	.21	.59	7	4
WSW	.22	.68	15	13
W	.20	.63	19	31
WNW	.21	.36	0	0
NW	.20	.39	1	0
NNW	.23	.61	7	9
N	.24	.66	3	13

1993 PHASE I BUILD CONDITION

LOCATION 13

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.53	3	1
NE	.16	.43	3	1
ENE	.17	.42	2	1
E	.15	.35	0	0
ESE	.14	.29	0	0
SE	.15	.32	0	0
SSE	.15	.33	0	0
S	.14	.28	0	0
SSW	.14	.30	0	0
SW	.14	.30	0	0
WSW	.16	.38	0	0
W	.18	.47	2	1
WNW	.18	.58	47	60
NW	.22	.55	30	23
NNW	.23	.59	10	7
N	.28	.60	3	7

LOCATION 14

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.24	.52	0	0
NE	.21	.54	4	1
ENE	.20	.57	5	3
E	.18	.46	0	0
ESE	.24	.59	1	0
SE	.27	.61	0	0
SSE	.32	.66	0	0
S	.30	.60	1	0
SSW	.28	.60	1	0
SW	.22	.55	1	0
WSW	.22	.59	1	0
W	.26	.69	14	13
WNW	.26	.70	42	56
NW	.23	.68	30	25
NNW	.22	.58	1	0
N	.29	.58	0	1

LOCATION 15

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.46	0	0
NE	.21	.56	7	2
ENE	.23	.66	15	11
E	.20	.34	0	0
ESE	.22	.40	0	0
SE	.23	.37	0	0
SSE	.21	.41	0	0
S	.19	.38	0	0
SSW	.18	.42	0	0
SW	.18	.43	0	0
WSW	.22	.62	3	1
W	.25	.60	7	7
WNW	.23	.62	26	35
NW	.23	.67	37	40
NNW	.22	.63	4	3
N	.20	.54	0	1

2000 FULL-BUILD CONDITION

LOCATION 13

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.21	.53	3	1
NE	.15	.36	1	0
ENE	.13	.26	0	0
E	.14	.28	0	0
ESE	.14	.30	0	0
SE	.14	.31	0	0
SSE	.14	.27	0	0
S	.13	.25	0	0
SSW	.14	.29	0	0
SW	.14	.30	0	0
WSW	.15	.38	0	0
W	.19	.45	2	1
WNW	.19	.53	32	36
NW	.23	.59	51	53
NNW	.22	.56	9	6
N	.22	.54	1	4

LOCATION 14

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.21	.48	0	0
NE	.24	.59	4	1
ENE	.30	.59	4	2
E	.19	.44	0	0
ESE	.17	.45	0	0
SE	.21	.46	0	0
SSE	.25	.56	0	0
S	.31	.60	0	0
SSW	.25	.60	0	0
SW	.20	.49	0	0
WSW	.21	.57	0	0
W	.26	.71	10	9
WNW	.24	.72	32	38
NW	.25	.80	48	50
NNW	.23	.53	0	0
N	.28	.56	0	0

LOCATION 15

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.44	0	0
NE	.21	.57	8	2
ENE	.22	.62	11	7
E	.19	.50	0	0
ESE	.21	.36	0	0
SE	.23	.35	0	0
SSE	.22	.35	0	0
S	.21	.38	0	0
SSW	.19	.38	0	0
SW	.17	.42	0	0
WSW	.20	.60	2	1
W	.22	.60	6	5
WNW	.21	.59	18	21
NW	.25	.71	50	60
NNW	.22	.62	4	3
N	.19	.56	0	1

TABLE C-22

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 16

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.56	2	2
NE	.27	.63	20	12
ENE	.36	.65	20	20
E	.34	.61	5	4
ESE	.28	.57	2	0
SE	.20	.58	0	0
SSE	.23	.53	0	0
S	.28	.61	3	3
SSW	.31	.65	6	4
SW	.26	.60	9	7
WSW	.27	.70	21	24
W	.19	.57	8	17
WNW	.14	.41	1	1
NW	.15	.42	2	1
NNW	.16	.45	0	0
N	.18	.52	0	3

LOCATION 17

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.17	.50	1	1
NE	.26	.62	23	12
ENE	.35	.63	23	19
E	.33	.58	5	4
ESE	.32	.60	3	1
SE	.24	.60	1	0
SSE	.28	.56	0	0
S	.25	.59	3	3
SSW	.28	.61	6	3
SW	.22	.55	6	3
WSW	.20	.49	1	0
W	.16	.42	0	0
WNW	.15	.39	1	1
NW	.16	.40	2	1
NNW	.17	.49	1	1
N	.31	.79	23	49

LOCATION 18

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.51	2	2
NE	.25	.59	22	13
ENE	.33	.60	23	21
E	.28	.55	4	4
ESE	.27	.54	2	0
SE	.22	.51	0	0
SSE	.28	.57	1	1
S	.24	.57	3	3
SSW	.27	.64	11	7
SW	.20	.54	9	6
WSW	.20	.51	2	2
W	.17	.42	1	1
WNW	.14	.37	1	1
NW	.14	.38	2	1
NNW	.16	.53	4	7
N	.24	.66	9	29

1993 PHASE I BUILD CONDITION

LOCATION 16

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.11	.23	0	0
NE	.11	.23	0	0
ENE	.15	.45	24	18
E	.15	.38	3	1
ESE	.12	.29	0	0
SE	.12	.28	0	0
SSE	.16	.40	0	0
S	.15	.42	3	2
SSW	.12	.33	0	0
SW	.12	.26	0	0
WSW	.12	.30	0	0
W	.14	.37	7	8
WNW	.14	.36	15	20
NW	.15	.41	38	45
NNW	.14	.40	6	6
N	.12	.28	0	0

LOCATION 17

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.17	.48	0	0
NE	.16	.38	0	0
ENE	.25	.59	4	4
E	.20	.45	0	0
ESE	.19	.56	0	0
SE	.27	.62	0	0
SSE	.40	.69	0	0
S	.47	.82	5	4
SSW	.36	.83	9	5
SW	.32	.87	35	24
WSW	.20	.56	0	0
W	.19	.52	0	0
WNW	.19	.51	1	1
NW	.28	.70	25	32
NNW	.40	.82	18	25
N	.31	.67	0	4

LOCATION 18

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.17	.50	0	0
NE	.16	.44	1	0
ENE	.19	.54	3	2
E	.27	.67	3	2
ESE	.40	.85	7	3
SE	.29	.65	0	0
SSE	.32	.65	0	0
S	.28	.66	2	1
SSW	.30	.72	4	2
SW	.36	.80	26	17
WSW	.20	.62	1	1
W	.18	.55	1	1
WNW	.21	.54	4	5
NW	.30	.69	30	38
NNW	.37	.78	17	23
N	.26	.65	0	4

2000 FULL-BUILD CONDITION

LOCATION 16

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.11	.22	0	0
NE	.11	.23	0	0
ENE	.13	.36	8	5
E	.14	.42	6	3
ESE	.11	.25	0	0
SE	.12	.26	0	0
SSE	.14	.38	0	0
S	.18	.46	6	4
SSW	.13	.36	1	0
SW	.12	.29	0	0
WSW	.12	.32	0	0
W	.14	.37	7	6
WNW	.14	.37	19	24
NW	.16	.43	47	55
NNW	.14	.38	3	2
N	.11	.25	0	0

LOCATION 17

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.46	0	0
NE	.14	.34	0	0
ENE	.20	.49	1	1
E	.17	.48	0	0
ESE	.20	.60	1	0
SE	.23	.53	0	0
SSE	.34	.57	0	0
S	.45	.73	3	2
SSW	.36	.75	4	2
SW	.42	.89	47	33
WSW	.20	.60	0	0
W	.18	.49	0	0
WNW	.20	.56	4	7
NW	.32	.69	26	33
NNW	.40	.78	13	18
N	.28	.65	0	3

LOCATION 18

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.17	.45	0	0
NE	.13	.36	0	0
ENE	.16	.44	1	0
E	.23	.62	2	1
ESE	.27	.66	2	0
SE	.18	.46	0	0
SSE	.19	.48	0	0
S	.24	.58	1	0
SSW	.25	.63	1	1
SW	.40	.79	26	14
WSW	.22	.64	2	1
W	.18	.53	1	1
WNW	.21	.59	10	13
NW	.33	.72	40	50
NNW	.37	.76	15	16
N	.24	.62	0	2

TABLE C-23

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 19

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.50	3	2
NE	.23	.54	20	11
ENE	.30	.56	20	18
E	.26	.50	3	3
ESE	.27	.54	3	1
SE	.21	.49	0	0
SSE	.26	.57	1	1
S	.21	.62	8	7
SSW	.22	.62	14	9
SW	.17	.46	3	2
WSW	.20	.52	6	6
W	.17	.44	3	5
WNW	.13	.31	0	0
NW	.14	.37	2	1
NNW	.14	.43	1	1
N	.22	.63	10	30

LOCATION 20

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.24	.63	8	5
NE	.27	.58	18	9
ENE	.33	.60	19	16
E	.30	.55	4	2
ESE	.27	.57	2	0
SE	.27	.55	0	0
SSE	.28	.65	1	1
S	.21	.68	8	6
SSW	.20	.55	2	1
SW	.17	.48	1	1
WSW	.23	.59	8	6
W	.23	.55	11	16
WNW	.16	.42	2	3
NW	.15	.37	1	0
NNW	.15	.40	0	0
N	.30	.72	13	32

LOCATION 21

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.25	.61	6	3
NE	.25	.56	13	5
ENE	.30	.55	11	8
E	.27	.51	2	1
ESE	.22	.54	1	0
SE	.25	.60	1	0
SSE	.24	.67	1	1
S	.21	.64	5	3
SSW	.19	.49	1	0
SW	.16	.44	0	0
WSW	.24	.65	15	10
W	.27	.66	36	51
WNW	.18	.44	3	3
NW	.14	.35	0	0
NNW	.15	.40	0	0
N	.24	.65	4	13

1993 PHASE I BUILD CONDITION

LOCATION 19

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.52	1	0
NE	.12	.31	0	0
ENE	.13	.33	0	0
E	.14	.29	0	0
ESE	.18	.34	0	0
SE	.13	.26	0	0
SSE	.14	.29	0	0
S	.14	.31	0	0
SSW	.13	.38	0	0
SW	.12	.29	0	0
WSW	.13	.33	0	0
W	.13	.31	0	0
WNW	.14	.38	0	0
NW	.24	.61	35	31
NNW	.33	.79	54	51
N	.22	.72	9	18

LOCATION 20

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.25	.56	5	3
NE	.15	.35	1	0
ENE	.15	.35	1	1
E	.13	.27	0	0
ESE	.15	.31	0	0
SE	.18	.43	0	0
SSE	.30	.65	2	1
S	.26	.62	6	5
SSW	.26	.59	7	4
SW	.26	.63	33	22
WSW	.24	.58	10	8
W	.19	.46	3	3
WNW	.14	.40	2	2
NW	.18	.43	7	4
NNW	.21	.55	7	9
N	.33	.70	15	36

LOCATION 21

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.26	.61	14	9
NE	.14	.35	2	0
ENE	.14	.32	1	0
E	.17	.37	0	0
ESE	.17	.43	1	0
SE	.28	.57	2	0
SSE	.31	.72	4	4
S	.19	.55	5	3
SSW	.19	.50	3	1
SW	.18	.47	5	2
WSW	.20	.56	14	10
W	.20	.50	15	19
WNW	.13	.36	2	1
NW	.16	.43	12	8
NNW	.18	.49	5	5
N	.29	.64	15	32

2000 FULL-BUILD CONDITION

LOCATION 19

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.15	.47	1	0
NE	.12	.28	0	0
ENE	.12	.32	0	0
E	.12	.27	0	0
ESE	.14	.30	0	0
SE	.13	.25	0	0
SSE	.13	.27	0	0
S	.13	.28	0	0
SSW	.13	.34	0	0
SW	.12	.26	0	0
WSW	.12	.31	0	0
W	.13	.33	0	0
WNW	.14	.39	0	0
NW	.26	.65	53	55
NNW	.34	.75	42	36
N	.21	.66	4	10

LOCATION 20

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.26	.57	6	4
NE	.13	.29	0	0
ENE	.15	.37	1	1
E	.13	.30	0	0
ESE	.16	.34	0	0
SE	.21	.52	0	0
SSE	.32	.67	2	2
S	.28	.67	10	8
SSW	.26	.57	6	3
SW	.27	.61	27	17
WSW	.23	.56	8	7
W	.18	.45	3	3
WNW	.14	.37	1	1
NW	.18	.46	12	9
NNW	.21	.55	9	11
N	.32	.69	14	34

LOCATION 21

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.25	.59	11	7
NE	.13	.33	1	0
ENE	.14	.33	1	0
E	.15	.34	0	0
ESE	.18	.42	1	0
SE	.31	.70	6	2
SSE	.31	.70	4	3
S	.19	.57	6	4
SSW	.19	.48	2	1
SW	.19	.48	5	2
WSW	.19	.52	7	4
W	.20	.54	24	31
WNW	.14	.33	0	0
NW	.16	.42	9	5
NNW	.18	.52	7	7
N	.28	.66	16	33

TABLE C-24

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 22

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.21	.58	2	1
NE	.28	.60	11	4
ENE	.32	.59	9	7
E	.31	.62	3	2
ESE	.20	.54	1	0
SE	.29	.60	0	0
SSE	.39	.75	1	1
S	.34	.79	8	6
SSW	.24	.60	1	1
SW	.23	.63	7	3
WSW	.29	.72	14	10
W	.29	.74	36	52
WNW	.16	.48	2	2
NW	.14	.40	1	0
NNW	.15	.48	0	0
N	.30	.70	3	11

LOCATION 23

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.23	.60	4	2
NE	.31	.60	14	6
ENE	.30	.52	6	4
E	.26	.57	3	1
ESE	.15	.45	0	0
SE	.28	.59	0	0
SSE	.33	.63	1	0
S	.36	.66	4	3
SSW	.34	.71	10	5
SW	.24	.56	4	2
WSW	.23	.58	3	2
W	.19	.69	35	50
WNW	.15	.47	3	3
NW	.15	.43	3	1
NNW	.18	.58	4	4
N	.28	.71	6	17

LOCATION 24

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.29	.57	2	1
NE	.37	.64	17	8
ENE	.38	.62	13	10
E	.35	.65	5	4
ESE	.21	.48	0	0
SE	.32	.64	1	0
SSE	.36	.66	1	0
S	.39	.65	3	2
SSW	.38	.64	3	2
SW	.32	.58	3	2
WSW	.30	.63	4	3
W	.24	.70	28	43
WNW	.20	.50	5	6
NW	.20	.49	6	3
NNW	.24	.63	5	6
N	.30	.67	2	10

1993 PHASE I BUILD CONDITION

LOCATION 22

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.11	.23	0	0
NE	.11	.21	0	0
ENE	.11	.22	0	0
E	.12	.22	0	0
ESE	.13	.33	0	0
SE	.17	.40	0	0
SSE	.24	.50	2	1
S	.26	.60	21	18
SSW	.18	.52	18	10
SW	.15	.41	9	5
WSW	.16	.44	9	7
W	.16	.44	24	36
WNW	.13	.37	15	25
NW	.12	.25	0	0
NNW	.11	.25	0	0
N	.12	.25	0	0

LOCATION 23

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.12	.29	0	0
NE	.12	.23	0	0
ENE	.13	.32	0	0
E	.22	.52	3	1
ESE	.22	.54	2	0
SE	.24	.49	0	0
SSE	.19	.46	0	0
S	.16	.45	0	0
SSW	.19	.49	1	0
SW	.19	.48	2	0
WSW	.24	.65	20	11
W	.26	.70	62	80
WNW	.15	.46	8	7
NW	.13	.38	2	0
NNW	.12	.24	0	0
N	.12	.27	0	0

LOCATION 24

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.17	.37	3	2
NE	.18	.40	17	11
ENE	.21	.45	26	26
E	.25	.56	30	31
ESE	.25	.59	16	14
SE	.18	.36	0	0
SSE	.16	.33	0	0
S	.18	.31	0	0
SSW	.18	.31	0	0
SW	.16	.32	1	1
WSW	.16	.33	0	1
W	.17	.32	2	4
WNW	.15	.28	1	4
NW	.14	.24	1	0
NNW	.15	.26	0	0
N	.15	.29	0	1

2000 FULL-BUILD CONDITION

LOCATION 22

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.12	.22	0	0
NE	.11	.21	0	0
ENE	.11	.20	0	0
E	.12	.23	0	0
ESE	.13	.34	1	0
SE	.20	.48	2	1
SSE	.25	.51	2	2
S	.25	.60	21	19
SSW	.18	.57	28	18
SW	.15	.43	11	8
WSW	.16	.44	9	9
W	.16	.43	17	30
WNW	.12	.34	7	12
NW	.12	.28	2	1
NNW	.12	.24	0	0
N	.12	.25	0	0

LOCATION 23

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.12	.25	0	0
NE	.12	.30	0	0
ENE	.16	.42	2	1
E	.26	.52	3	1
ESE	.31	.64	5	1
SE	.30	.62	1	0
SSE	.21	.49	0	0
S	.17	.46	0	0
SSW	.20	.51	1	0
SW	.19	.50	3	1
WSW	.23	.65	21	13
W	.26	.69	58	79
WNW	.15	.43	4	3
NW	.13	.39	2	0
NNW	.12	.27	0	0
N	.11	.25	0	0

LOCATION 24

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.31	0	0
NE	.19	.39	12	8
ENE	.25	.51	36	35
E	.27	.58	29	31
ESE	.30	.63	17	16
SE	.18	.40	0	0
SSE	.16	.32	0	0
S	.17	.30	0	0
SSW	.18	.30	0	0
SW	.17	.34	1	2
WSW	.16	.31	0	0
W	.15	.31	1	1
WNW	.14	.27	0	1
NW	.14	.24	0	0
NNW	.14	.25	0	0
N	.14	.24	0	0

TABLE C-25

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 25

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.24	.57	2	1
NE	.34	.64	20	10
ENE	.34	.56	9	7
E	.31	.58	3	2
ESE	.20	.50	1	0
SE	.25	.57	0	0
SSE	.32	.60	0	0
S	.36	.63	3	2
SSW	.34	.64	4	2
SW	.28	.57	4	2
WSW	.27	.62	6	4
W	.24	.67	28	42
WNW	.17	.49	5	6
NW	.16	.48	6	3
NNW	.20	.59	4	4
N	.24	.69	4	14

LOCATION 26

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.25	.57	4	3
NE	.34	.62	24	14
ENE	.34	.59	18	15
E	.31	.62	8	6
ESE	.27	.61	4	1
SE	.18	.51	0	0
SSE	.26	.57	0	0
S	.26	.53	1	1
SSW	.23	.51	1	1
SW	.20	.46	1	0
WSW	.22	.56	5	5
W	.19	.58	17	29
WNW	.14	.41	2	2
NW	.15	.45	7	5
NNW	.18	.54	4	5
N	.18	.58	2	10

LOCATION 27

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.26	.57	2	1
NE	.36	.65	20	12
ENE	.38	.64	16	15
E	.33	.65	6	5
ESE	.31	.70	4	1
SE	.20	.57	0	0
SSE	.26	.62	0	0
S	.34	.63	3	2
SSW	.34	.62	3	2
SW	.31	.59	6	4
WSW	.31	.68	13	13
W	.24	.64	17	33
WNW	.15	.44	1	2
NW	.16	.49	6	5
NNW	.19	.54	1	2
N	.19	.51	0	2

1993 PHASE I BUILD CONDITION

LOCATION 25

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.12	.27	0	0
NE	.13	.30	7	4
ENE	.15	.37	18	19
E	.18	.48	24	26
ESE	.19	.52	14	12
SE	.13	.34	0	0
SSE	.15	.40	1	1
S	.21	.47	13	15
SSW	.18	.43	14	11
SW	.16	.34	6	6
WSW	.16	.31	1	2
W	.12	.25	0	1
WNW	.11	.21	0	0
NW	.12	.21	0	0
NNW	.11	.20	0	0
N	.12	.26	0	1

LOCATION 26

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.18	.51	5	4
NE	.23	.55	26	15
ENE	.26	.60	33	29
E	.23	.58	11	10
ESE	.24	.61	7	3
SE	.16	.50	1	0
SSE	.16	.41	0	0
S	.13	.28	0	0
SSW	.12	.27	0	0
SW	.12	.28	0	0
WSW	.12	.23	0	0
W	.12	.25	0	0
WNW	.15	.44	16	35
NW	.12	.29	0	0
NNW	.14	.36	0	0
N	.15	.42	0	2

LOCATION 27

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.21	.54	3	1
NE	.21	.49	6	1
ENE	.20	.50	7	3
E	.19	.49	1	0
ESE	.24	.55	2	0
SE	.18	.52	0	0
SSE	.21	.46	0	0
S	.21	.49	1	0
SSW	.18	.50	1	0
SW	.17	.39	0	0
WSW	.17	.39	0	0
W	.16	.49	3	1
WNW	.21	.64	69	87
NW	.16	.44	5	1
NNW	.17	.47	0	0
N	.21	.60	2	5

2000 FULL-BUILD CONDITION

LOCATION 25

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.12	.28	0	0
NE	.15	.35	4	3
ENE	.24	.53	33	33
E	.26	.64	34	36
ESE	.31	.70	21	21
SE	.14	.40	0	0
SSE	.15	.42	0	0
S	.19	.46	4	5
SSW	.17	.37	1	1
SW	.16	.35	1	1
WSW	.14	.29	0	0
W	.12	.25	0	0
WNW	.11	.22	0	0
NW	.12	.23	0	0
NNW	.11	.21	0	0
N	.12	.22	0	0

LOCATION 26

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.14	.41	0	0
NE	.15	.38	2	1
ENE	.23	.53	13	13
E	.29	.59	8	7
ESE	.31	.65	6	3
SE	.20	.54	0	0
SSE	.19	.48	0	0
S	.14	.39	0	0
SSW	.18	.52	2	2
SW	.28	.64	37	30
WSW	.22	.61	16	18
W	.14	.42	1	2
WNW	.17	.46	10	23
NW	.15	.39	3	2
NNW	.13	.35	0	0
N	.12	.29	0	0

LOCATION 27

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.15	.38	0	0
NE	.20	.47	3	1
ENE	.33	.65	18	18
E	.36	.70	9	9
ESE	.40	.80	8	5
SE	.21	.60	0	0
SSE	.18	.53	0	0
S	.17	.45	0	0
SSW	.23	.61	2	2
SW	.32	.74	35	32
WSW	.29	.74	23	30
W	.15	.50	1	3
WNW	.13	.37	0	0
NW	.13	.35	0	0
NNW	.13	.32	0	0
N	.13	.33	0	0

TABLE C-26

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 28

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.24	.53	2	1
NE	.33	.60	16	8
ENE	.34	.60	14	12
E	.32	.55	2	2
ESE	.31	.59	2	0
SE	.23	.54	0	0
SSE	.29	.57	0	0
S	.36	.64	4	3
SSW	.30	.59	3	2
SW	.29	.57	6	3
WSW	.32	.68	17	15
W	.29	.63	20	33
WNW	.19	.46	4	6
NW	.18	.43	3	1
NNW	.21	.55	3	3
N	.23	.62	2	10

LOCATION 29

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.54	2	1
NE	.29	.60	16	8
ENE	.33	.59	14	12
E	.29	.57	3	2
ESE	.30	.61	2	0
SE	.23	.56	0	0
SSE	.31	.60	0	0
S	.31	.69	6	5
SSW	.30	.62	4	3
SW	.28	.62	11	7
WSW	.29	.68	17	15
W	.24	.61	16	26
WNW	.15	.39	0	0
NW	.15	.42	2	1
NNW	.17	.53	1	2
N	.22	.67	4	17

LOCATION 30

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.52	2	1
NE	.25	.60	21	12
ENE	.33	.61	20	18
E	.30	.57	5	4
ESE	.32	.62	4	1
SE	.22	.60	1	0
SSE	.28	.57	0	0
S	.27	.62	4	4
SSW	.29	.63	7	4
SW	.22	.56	8	5
WSW	.23	.59	8	7
W	.19	.51	5	9
WNW	.14	.36	0	0
NW	.14	.44	6	4
NNW	.15	.48	1	1
N	.25	.69	9	28

1993 PHASE I BUILD CONDITION

LOCATION 28

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.18	.42	0	0
NE	.17	.41	3	1
ENE	.17	.44	4	3
E	.20	.50	3	2
ESE	.23	.54	2	0
SE	.18	.53	0	0
SSE	.18	.44	0	0
S	.17	.35	0	0
SSW	.19	.41	0	0
SW	.32	.66	43	29
WSW	.23	.53	4	3
W	.20	.43	1	1
WNW	.22	.51	24	47
NW	.18	.45	10	8
NNW	.20	.51	3	4
N	.17	.39	0	0

LOCATION 29

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.15	.39	0	0
NE	.26	.57	12	7
ENE	.43	.77	40	36
E	.47	.76	18	17
ESE	.48	.79	9	6
SE	.28	.66	1	1
SSE	.24	.55	0	0
S	.14	.33	0	0
SSW	.15	.34	0	0
SW	.20	.43	0	0
WSW	.20	.41	0	0
W	.16	.36	0	0
WNW	.15	.34	0	0
NW	.20	.50	10	10
NNW	.28	.61	7	13
N	.23	.59	1	9

LOCATION 30

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.45	0	0
NE	.17	.49	3	1
ENE	.19	.60	11	7
E	.17	.56	2	1
ESE	.19	.70	4	1
SE	.22	.66	1	0
SSE	.23	.65	1	0
S	.18	.43	0	0
SSW	.17	.44	0	0
SW	.21	.50	0	0
WSW	.18	.47	0	0
W	.15	.39	0	0
WNW	.16	.43	1	0
NW	.19	.69	48	57
NNW	.24	.77	29	28
N	.21	.65	2	6

2000 FULL-BUILD CONDITION

LOCATION 28

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.51	2	1
NE	.25	.53	12	7
ENE	.36	.69	33	30
E	.38	.74	21	20
ESE	.36	.70	7	4
SE	.20	.53	0	0
SSE	.21	.42	0	0
S	.24	.45	0	0
SSW	.22	.47	0	0
SW	.22	.51	3	3
WSW	.19	.47	1	1
W	.18	.44	1	1
WNW	.19	.42	2	4
NW	.18	.48	12	14
NNW	.21	.53	3	6
N	.20	.54	1	7

LOCATION 29

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.14	.35	0	0
NE	.18	.51	5	2
ENE	.35	.74	32	29
E	.46	.86	27	25
ESE	.49	.91	15	11
SE	.20	.56	0	0
SSE	.14	.36	0	0
S	.13	.25	0	0
SSW	.14	.29	0	0
SW	.17	.38	0	0
WSW	.17	.37	0	0
W	.15	.33	0	0
WNW	.15	.36	0	0
NW	.22	.56	17	22
NNW	.28	.59	4	7
N	.20	.54	0	3

LOCATION 30

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.15	.43	0	0
NE	.14	.41	0	0
ENE	.17	.44	1	0
E	.21	.64	3	1
ESE	.22	.68	2	0
SE	.16	.48	0	0
SSE	.20	.55	0	0
S	.26	.61	1	0
SSW	.17	.47	0	0
SW	.20	.50	0	0
WSW	.17	.44	0	0
W	.15	.42	0	0
WNW	.16	.46	1	0
NW	.22	.79	66	75
NNW	.23	.81	26	20
N	.21	.67	1	3

TABLE C-27

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 31

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.21	.55	2	2
NE	.31	.64	22	13
ENE	.33	.62	17	16
E	.30	.58	3	3
ESE	.31	.62	3	1
SE	.22	.62	1	0
SSE	.28	.59	0	0
S	.33	.64	4	4
SSW	.28	.59	3	2
SW	.29	.62	12	9
WSW	.30	.66	14	15
W	.23	.58	10	19
WNW	.15	.40	0	1
NW	.15	.44	3	2
NNW	.17	.54	2	3
N	.21	.62	2	11

LOCATION 32

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.18	.49	1	1
NE	.26	.58	14	8
ENE	.30	.58	13	12
E	.29	.56	3	2
ESE	.32	.62	3	1
SE	.21	.63	1	0
SSE	.28	.61	1	1
S	.35	.65	5	4
SSW	.29	.61	4	3
SW	.29	.62	14	11
WSW	.30	.69	22	24
W	.24	.58	13	25
WNW	.15	.41	1	2
NW	.15	.43	4	2
NNW	.16	.48	0	1
N	.18	.52	0	3

LOCATION 33

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.21	.54	3	2
NE	.30	.60	22	13
ENE	.31	.57	15	15
E	.29	.55	4	3
ESE	.28	.59	3	1
SE	.18	.58	1	0
SSE	.24	.54	0	0
S	.31	.61	4	4
SSW	.29	.60	5	4
SW	.29	.60	16	13
WSW	.26	.63	14	16
W	.18	.50	4	8
WNW	.15	.41	2	4
NW	.15	.42	4	3
NNW	.17	.53	3	6
N	.19	.54	1	7

1993 PHASE I BUILD CONDITION

LOCATION 31

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.18	.49	0	0
NE	.24	.51	2	0
ENE	.38	.71	14	11
E	.41	.73	5	3
ESE	.42	.77	4	1
SE	.32	.71	1	0
SSE	.31	.69	0	0
S	.22	.54	0	0
SSW	.19	.49	0	0
SW	.34	.77	19	11
WSW	.37	.74	7	5
W	.29	.63	5	5
WNW	.28	.66	23	40
NW	.19	.57	8	4
NNW	.27	.76	12	14
N	.24	.65	0	3

LOCATION 32

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.55	0	0
NE	.17	.43	0	0
ENE	.25	.58	4	4
E	.28	.63	2	1
ESE	.25	.62	1	0
SE	.21	.60	0	0
SSE	.20	.58	0	0
S	.21	.54	0	0
SSW	.21	.53	0	0
SW	.40	.84	33	23
WSW	.35	.90	36	35
W	.22	.75	21	35
WNW	.16	.52	2	2
NW	.13	.30	0	0
NNW	.13	.31	0	0
N	.18	.54	0	0

LOCATION 33

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.14	.37	8	7
NE	.14	.32	11	7
ENE	.13	.26	3	4
E	.15	.36	6	6
ESE	.16	.40	5	3
SE	.16	.40	2	1
SSE	.16	.38	1	1
S	.19	.47	16	18
SSW	.15	.42	14	12
SW	.15	.38	24	23
WSW	.14	.35	6	8
W	.13	.27	1	4
WNW	.13	.24	1	4
NW	.13	.23	2	1
NNW	.12	.24	0	0
N	.13	.25	0	1

2000 FULL-BUILD CONDITION

LOCATION 31

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.15	.41	0	0
NE	.23	.51	3	1
ENE	.33	.67	13	10
E	.27	.64	3	1
ESE	.39	.80	5	1
SE	.28	.67	0	0
SSE	.28	.75	1	1
S	.25	.51	0	0
SSW	.24	.51	0	0
SW	.26	.63	4	1
WSW	.27	.60	1	0
W	.28	.66	10	11
WNW	.25	.60	13	17
NW	.24	.71	39	47
NNW	.24	.71	8	8
N	.18	.49	0	0

LOCATION 32

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.17	.50	1	0
NE	.17	.45	3	1
ENE	.23	.59	15	10
E	.23	.62	7	4
ESE	.29	.71	6	2
SE	.23	.65	1	0
SSE	.22	.63	1	0
S	.21	.52	1	1
SSW	.26	.53	1	0
SW	.27	.54	5	1
WSW	.24	.52	1	0
W	.23	.59	17	18
WNW	.22	.58	34	48
NW	.16	.38	1	0
NNW	.18	.48	1	0
N	.22	.66	5	13

LOCATION 33

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.14	.30	1	0
NE	.13	.27	3	1
ENE	.15	.33	11	8
E	.17	.47	22	17
ESE	.23	.55	19	12
SE	.18	.43	3	1
SSE	.19	.49	4	4
S	.15	.40	6	5
SSW	.14	.28	0	0
SW	.14	.28	1	0
WSW	.14	.27	0	0
W	.13	.30	3	3
WNW	.15	.33	22	37
NW	.14	.25	3	1
NNW	.16	.31	2	2
N	.16	.36	2	7

TABLE C-28

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 34

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.23	.54	2	2
NE	.33	.63	23	13
ENE	.33	.63	20	18
E	.29	.57	4	3
ESE	.30	.59	2	1
SE	.18	.59	1	0
SSE	.22	.54	0	0
S	.31	.58	2	2
SSW	.29	.58	3	2
SW	.28	.57	7	5
WSW	.29	.64	12	13
W	.22	.56	10	19
WNW	.16	.45	3	6
NW	.15	.42	3	1
NNW	.20	.57	5	9
N	.19	.53	0	4

LOCATION 35

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.27	.57	3	2
NE	.36	.65	23	14
ENE	.35	.62	17	16
E	.31	.58	4	3
ESE	.26	.57	2	0
SE	.21	.60	1	0
SSE	.26	.58	0	0
S	.32	.63	3	3
SSW	.30	.59	3	2
SW	.32	.61	12	9
WSW	.30	.65	12	13
W	.19	.49	2	4
WNW	.16	.48	5	11
NW	.16	.44	3	2
NNW	.24	.61	8	13
N	.22	.56	1	5

LOCATION 36

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.21	.55	3	2
NE	.30	.62	22	13
ENE	.31	.61	19	17
E	.31	.58	5	4
ESE	.26	.53	1	0
SE	.22	.61	1	0
SSE	.26	.62	1	1
S	.30	.59	3	3
SSW	.31	.58	4	2
SW	.27	.58	10	7
WSW	.27	.60	7	7
W	.19	.52	6	10
WNW	.15	.44	3	6
NW	.17	.47	9	8
NNW	.20	.56	5	8
N	.22	.57	1	8

1993 PHASE I BUILD CONDITION

LOCATION 34

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.28	.78	17	14
NE	.20	.54	8	4
ENE	.26	.62	14	13
E	.27	.62	5	4
ESE	.28	.70	5	2
SE	.24	.73	2	1
SSE	.25	.71	1	1
S	.29	.66	4	4
SSW	.21	.48	0	0
SW	.30	.64	13	10
WSW	.31	.69	16	16
W	.24	.60	11	19
WNW	.17	.47	3	6
NW	.14	.35	0	0
NNW	.16	.44	0	0
N	.18	.59	1	6

LOCATION 35

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.30	.65	7	7
NE	.26	.62	19	12
ENE	.27	.62	18	18
E	.24	.65	8	8
ESE	.31	.76	8	5
SE	.29	.73	3	2
SSE	.35	.74	2	3
S	.40	.76	11	12
SSW	.29	.70	11	9
SW	.25	.53	3	2
WSW	.19	.52	1	1
W	.19	.50	2	5
WNW	.17	.46	3	8
NW	.17	.42	3	2
NNW	.15	.42	0	0
N	.17	.52	0	3

LOCATION 36

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.64	6	6
NE	.20	.61	16	11
ENE	.30	.65	21	22
E	.32	.73	14	15
ESE	.28	.74	7	4
SE	.30	.80	5	3
SSE	.26	.71	1	2
S	.34	.74	9	11
SSW	.29	.75	17	14
SW	.17	.46	0	0
WSW	.16	.39	0	0
W	.14	.38	0	0
WNW	.15	.43	1	4
NW	.15	.37	1	0
NNW	.16	.45	0	0
N	.19	.56	0	6

2000 FULL-BUILD CONDITION

LOCATION 34

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.13	.27	1	1
NE	.13	.25	4	1
ENE	.14	.31	15	12
E	.14	.34	8	5
ESE	.17	.48	18	12
SE	.15	.36	2	1
SSE	.15	.36	1	1
S	.14	.31	2	2
SSW	.13	.26	0	0
SW	.13	.24	0	0
WSW	.13	.27	1	0
W	.14	.30	12	17
WNW	.14	.29	21	38
NW	.14	.25	8	5
NNW	.13	.24	0	0
N	.13	.29	0	3

LOCATION 35

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.30	.61	8	6
NE	.24	.59	22	13
ENE	.23	.54	13	12
E	.23	.62	9	8
ESE	.38	.83	16	12
SE	.31	.73	4	2
SSE	.34	.70	2	2
S	.25	.63	6	6
SSW	.20	.49	1	1
SW	.21	.46	1	1
WSW	.17	.42	0	0
W	.15	.41	0	1
WNW	.18	.45	7	15
NW	.16	.41	4	3
NNW	.23	.51	3	5
N	.27	.57	2	12

LOCATION 36

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.18	.53	3	2
NE	.21	.59	24	13
ENE	.16	.43	4	3
E	.18	.52	4	2
ESE	.23	.59	4	1
SE	.26	.64	2	1
SSE	.40	.76	4	4
S	.33	.75	18	15
SSW	.20	.51	2	1
SW	.16	.34	0	0
WSW	.15	.38	0	0
W	.16	.52	10	15
WNW	.17	.50	22	41
NW	.16	.37	2	0
NNW	.16	.40	0	0
N	.17	.46	0	2

TABLE C-29

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 37

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.23	.54	2	1
NE	.32	.62	19	10
ENE	.32	.59	15	12
E	.31	.58	4	3
ESE	.29	.60	2	0
SE	.30	.62	1	0
SSE	.30	.65	1	1
S	.32	.60	3	2
SSW	.32	.60	3	2
SW	.31	.58	7	4
WSW	.24	.57	3	3
W	.17	.51	3	5
WNW	.16	.52	13	24
NW	.20	.56	22	27
NNW	.16	.46	0	0
N	.23	.55	1	4

LOCATION 38

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.25	.61	3	2
NE	.33	.68	23	12
ENE	.32	.61	13	10
E	.33	.59	3	2
ESE	.31	.62	2	0
SE	.29	.60	0	0
SSE	.27	.62	0	0
S	.32	.63	2	2
SSW	.33	.62	3	1
SW	.32	.58	4	2
WSW	.26	.57	2	1
W	.18	.51	2	2
WNW	.21	.61	29	54
NW	.21	.54	12	9
NNW	.20	.52	0	1
N	.20	.54	0	2

LOCATION 39

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.26	.60	7	6
NE	.33	.62	26	16
ENE	.28	.55	14	13
E	.20	.50	2	1
ESE	.21	.50	1	0
SE	.25	.56	1	0
SSE	.25	.61	1	1
S	.31	.63	5	5
SSW	.31	.59	6	4
SW	.29	.59	14	11
WSW	.20	.52	2	2
W	.17	.51	6	11
WNW	.17	.48	12	26
NW	.14	.36	1	0
NNW	.16	.46	0	1
N	.19	.49	0	3

1993 PHASE I BUILD CONDITION

LOCATION 37

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.62	4	5
NE	.32	.78	41	33
ENE	.28	.65	18	21
E	.22	.58	3	3
ESE	.24	.64	3	1
SE	.27	.71	1	1
SSE	.34	.79	2	3
S	.38	.76	9	12
SSW	.36	.79	19	18
SW	.22	.49	1	1
WSW	.15	.39	0	0
W	.13	.29	0	0
WNW	.13	.30	0	0
NW	.13	.27	0	0
NNW	.14	.35	0	0
N	.16	.43	0	0

LOCATION 38

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.34	.70	10	9
NE	.37	.70	30	19
ENE	.25	.56	9	9
E	.17	.41	0	0
ESE	.23	.73	6	3
SE	.29	.79	4	2
SSE	.36	.75	2	2
S	.35	.71	7	7
SSW	.33	.72	13	9
SW	.22	.49	1	1
WSW	.18	.53	1	1
W	.16	.44	0	0
WNW	.16	.44	2	3
NW	.14	.40	1	0
NNW	.28	.62	8	13
N	.35	.70	6	22

LOCATION 39

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.23	.58	6	4
NE	.26	.56	17	9
ENE	.20	.50	9	8
E	.18	.45	1	0
ESE	.23	.50	1	0
SE	.27	.57	1	0
SSE	.40	.79	4	5
S	.38	.76	17	15
SSW	.27	.65	12	7
SW	.19	.51	5	3
WSW	.15	.41	0	0
W	.17	.46	3	4
WNW	.20	.50	19	38
NW	.16	.42	5	2
NNW	.17	.43	0	0
N	.17	.48	0	2

2000 FULL-BUILD CONDITION

LOCATION 37

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.15	.43	11	7
NE	.13	.32	7	3
ENE	.13	.28	3	2
E	.13	.30	1	0
ESE	.15	.37	2	0
SE	.16	.40	1	0
SSE	.19	.48	2	2
S	.21	.49	12	9
SSW	.16	.41	7	3
SW	.13	.26	0	0
WSW	.13	.26	0	0
W	.14	.37	13	17
WNW	.14	.35	21	33
NW	.14	.33	15	11
NNW	.14	.34	2	2
N	.15	.40	3	10

LOCATION 38

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.14	.33	5	3
NE	.13	.30	10	4
ENE	.16	.37	25	20
E	.18	.40	14	10
ESE	.15	.33	2	0
SE	.13	.27	0	0
SSE	.14	.31	0	0
S	.15	.33	2	2
SSW	.14	.29	1	0
SW	.12	.23	0	0
WSW	.12	.22	0	0
W	.15	.35	25	37
WNW	.14	.29	14	21
NW	.12	.21	1	0
NNW	.12	.23	0	0
N	.12	.24	0	0

LOCATION 39

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.38	0	0
NE	.19	.42	3	1
ENE	.20	.44	4	2
E	.25	.49	2	1
ESE	.25	.54	2	0
SE	.26	.55	1	0
SSE	.23	.57	1	0
S	.19	.48	1	0
SSW	.13	.30	0	0
SW	.13	.27	0	0
WSW	.16	.40	0	0
W	.20	.51	7	4
WNW	.26	.60	65	86
NW	.20	.49	15	6
NNW	.20	.45	1	0
N	.18	.42	0	0

TABLE C-30

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 40

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.25	.57	4	2
NE	.28	.60	20	10
ENE	.28	.56	14	11
E	.22	.52	2	1
ESE	.28	.57	2	0
SE	.30	.57	1	0
SSE	.28	.62	1	1
S	.31	.63	5	4
SSW	.32	.61	6	3
SW	.30	.57	10	6
WSW	.22	.54	3	2
W	.18	.52	6	9
WNW	.19	.54	23	45
NW	.15	.43	4	2
NNW	.16	.44	0	0
N	.18	.48	0	2

LOCATION 41

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.47	1	0
NE	.19	.46	4	1
ENE	.18	.48	6	3
E	.27	.59	5	3
ESE	.33	.61	3	0
SE	.31	.61	1	0
SSE	.26	.57	0	0
S	.27	.57	2	1
SSW	.32	.57	3	1
SW	.28	.52	4	1
WSW	.25	.54	3	1
W	.19	.56	12	12
WNW	.22	.60	48	72
NW	.18	.45	6	2
NNW	.20	.50	1	1
N	.19	.50	0	1

LOCATION 42

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.22	.55	1	1
NE	.28	.61	14	6
ENE	.31	.63	15	11
E	.33	.64	5	3
ESE	.31	.65	3	0
SE	.29	.63	1	0
SSE	.22	.59	0	0
S	.27	.61	2	1
SSW	.35	.68	6	3
SW	.30	.60	6	2
WSW	.26	.60	3	2
W	.19	.59	8	10
WNW	.23	.62	33	57
NW	.16	.44	2	0
NNW	.18	.50	0	0
N	.20	.53	0	1

1993 PHASE I BUILD CONDITION

LOCATION 40

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.24	.56	3	1
NE	.23	.51	7	3
ENE	.20	.49	5	4
E	.19	.45	0	0
ESE	.25	.50	1	0
SE	.29	.58	0	0
SSE	.40	.80	3	3
S	.40	.79	13	11
SSW	.36	.79	24	13
SW	.22	.50	1	1
WSW	.17	.52	1	0
W	.14	.41	0	0
WNW	.21	.58	30	54
NW	.20	.51	11	8
NNW	.17	.43	0	0
N	.18	.51	0	2

LOCATION 41

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.51	2	1
NE	.16	.42	3	1
ENE	.16	.42	4	2
E	.23	.50	2	1
ESE	.25	.50	1	0
SE	.26	.50	0	0
SSE	.27	.62	1	1
S	.31	.61	6	4
SSW	.26	.56	4	2
SW	.20	.49	3	1
WSW	.21	.61	15	10
W	.15	.47	4	4
WNW	.21	.55	39	63
NW	.20	.46	11	6
NNW	.21	.51	3	3
N	.21	.49	0	2

LOCATION 42

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.21	.52	3	2
NE	.23	.53	13	6
ENE	.24	.56	15	12
E	.21	.51	2	1
ESE	.21	.47	1	0
SE	.22	.48	0	0
SSE	.22	.57	1	0
S	.33	.65	7	6
SSW	.28	.59	6	3
SW	.18	.50	3	2
WSW	.19	.61	14	11
W	.15	.45	2	2
WNW	.19	.53	27	48
NW	.16	.38	2	0
NNW	.19	.48	1	1
N	.20	.53	1	5

2000 FULL-BUILD CONDITION

LOCATION 40

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.15	.40	5	4
NE	.14	.30	3	1
ENE	.19	.50	39	34
E	.27	.56	30	28
ESE	.20	.50	8	4
SE	.15	.39	1	0
SSE	.14	.31	0	0
S	.13	.27	0	0
SSW	.13	.23	0	0
SW	.12	.23	0	0
WSW	.12	.24	0	0
W	.13	.25	0	0
WNW	.13	.25	0	0
NW	.13	.30	5	3
NNW	.15	.37	4	6
N	.16	.42	3	14

LOCATION 41

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.26	.53	6	4
NE	.26	.48	13	6
ENE	.20	.46	9	8
E	.22	.48	3	2
ESE	.32	.63	7	3
SE	.39	.74	8	4
SSE	.34	.70	4	4
S	.27	.70	17	15
SSW	.15	.40	0	0
SW	.13	.31	0	0
WSW	.14	.31	0	0
W	.16	.48	9	14
WNW	.17	.46	17	32
NW	.16	.37	4	2
NNW	.18	.41	0	1
N	.22	.48	1	5

LOCATION 42

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.23	.52	4	4
NE	.23	.52	15	10
ENE	.20	.56	20	21
E	.17	.50	3	3
ESE	.28	.71	11	8
SE	.38	.72	6	4
SSE	.37	.73	4	5
S	.41	.70	14	16
SSW	.32	.59	9	7
SW	.23	.51	8	7
WSW	.15	.37	0	0
W	.14	.36	0	0
WNW	.15	.41	4	12
NW	.17	.29	0	0
NNW	.14	.30	0	0
N	.17	.39	0	1

TABLE C-31

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 43

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.31	.63	5	3
NE	.34	.65	21	11
ENE	.36	.65	18	16
E	.32	.60	3	2
ESE	.28	.56	1	0
SE	.30	.60	0	0
SSE	.24	.62	0	0
S	.27	.60	2	2
SSW	.33	.62	3	2
SW	.31	.58	5	3
WSW	.30	.60	3	3
W	.18	.50	2	2
WNW	.19	.56	17	33
NW	.22	.56	17	19
NNW	.19	.50	0	1
N	.20	.54	0	2

LOCATION 44

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.29	.60	4	2
NE	.34	.66	23	13
ENE	.34	.64	18	16
E	.28	.60	4	3
ESE	.26	.55	1	0
SE	.29	.62	1	0
SSE	.23	.58	0	0
S	.28	.58	2	1
SSW	.31	.59	2	1
SW	.30	.57	5	3
WSW	.30	.62	6	5
W	.20	.53	4	6
WNW	.17	.53	12	24
NW	.22	.55	17	19
NNW	.19	.50	0	1
N	.22	.56	0	4

LOCATION 45

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.27	.59	5	3
NE	.34	.62	22	13
ENE	.34	.62	19	18
E	.30	.60	6	5
ESE	.25	.54	2	0
SE	.22	.60	1	0
SSE	.23	.60	1	1
S	.25	.57	2	2
SSW	.29	.57	3	2
SW	.28	.57	8	6
WSW	.29	.60	7	7
W	.20	.52	6	10
WNW	.15	.43	2	4
NW	.19	.51	16	19
NNW	.18	.51	1	2
N	.24	.56	1	7

1993 PHASE I BUILD CONDITION

LOCATION 43

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.33	.63	10	6
NE	.32	.59	20	10
ENE	.28	.54	13	10
E	.21	.49	2	1
ESE	.15	.42	0	0
SE	.18	.45	0	0
SSE	.23	.56	0	0
S	.28	.61	5	4
SSW	.22	.53	2	1
SW	.17	.44	1	0
WSW	.17	.48	1	0
W	.14	.42	1	0
WNW	.15	.47	9	12
NW	.16	.41	3	1
NNW	.25	.64	22	26
N	.32	.70	12	28

LOCATION 44

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.25	.60	15	10
NE	.21	.56	29	15
ENE	.19	.49	14	11
E	.17	.42	1	1
ESE	.14	.35	0	0
SE	.17	.49	0	0
SSE	.17	.48	0	0
S	.20	.50	3	2
SSW	.17	.43	1	0
SW	.14	.37	0	0
WSW	.14	.43	1	1
W	.14	.37	1	1
WNW	.15	.43	13	21
NW	.13	.34	2	0
NNW	.15	.50	7	9
N	.22	.60	10	27

LOCATION 45

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.51	9	7
NE	.25	.55	35	23
ENE	.23	.49	20	18
E	.16	.38	1	1
ESE	.14	.39	1	0
SE	.15	.44	0	0
SSE	.21	.55	2	2
S	.24	.53	6	6
SSW	.22	.52	8	6
SW	.14	.39	2	1
WSW	.15	.42	2	2
W	.15	.35	1	1
WNW	.14	.40	11	25
NW	.13	.32	2	1
NNW	.13	.35	0	0
N	.14	.42	0	5

2000 FULL-BUILD CONDITION

LOCATION 43

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.27	.64	15	12
NE	.25	.65	38	24
ENE	.18	.52	14	13
E	.19	.56	7	6
ESE	.23	.62	5	2
SE	.26	.60	2	1
SSE	.27	.60	1	1
S	.27	.54	3	3
SSW	.20	.49	1	1
SW	.18	.46	2	2
WSW	.13	.38	0	0
W	.12	.29	0	0
WNW	.12	.25	0	0
NW	.13	.25	0	0
NNW	.12	.41	0	0
N	.21	.66	12	35

LOCATION 44

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.12	.26	2	1
NE	.12	.24	6	3
ENE	.13	.31	19	18
E	.14	.34	13	12
ESE	.14	.35	7	3
SE	.15	.40	6	3
SSE	.15	.38	3	3
S	.15	.37	11	11
SSW	.14	.31	5	4
SW	.12	.28	6	5
WSW	.11	.23	0	0
W	.11	.24	3	4
WNW	.11	.21	2	3
NW	.11	.22	6	4
NNW	.12	.25	1	2
N	.13	.30	2	11

LOCATION 45

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.13	.30	0	0
NE	.14	.38	4	2
ENE	.28	.55	25	26
E	.37	.69	29	32
ESE	.36	.72	15	13
SE	.32	.73	9	6
SSE	.25	.67	4	5
S	.23	.60	9	11
SSW	.20	.53	6	5
SW	.15	.38	1	1
WSW	.14	.36	0	0
W	.12	.29	0	0
WNW	.12	.26	0	0
NW	.12	.28	0	0
NNW	.12	.26	0	0
N	.13	.30	0	0

TABLE C-32

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 46

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.26	.59	3	2
NE	.36	.64	19	11
ENE	.36	.64	18	16
E	.30	.59	3	3
ESE	.29	.59	2	0
SE	.19	.59	0	0
SSE	.23	.62	0	0
S	.27	.57	1	1
SSW	.32	.59	2	1
SW	.32	.59	7	4
WSW	.33	.68	15	15
W	.24	.59	10	17
WNW	.17	.50	7	13
NW	.16	.49	8	6
NNW	.22	.55	2	3
N	.23	.56	0	4

LOCATION 47

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.27	.57	3	2
NE	.35	.61	17	10
ENE	.35	.60	15	14
E	.30	.57	3	2
ESE	.33	.65	4	1
SE	.20	.58	0	0
SSE	.23	.54	0	0
S	.29	.55	1	1
SSW	.32	.58	2	1
SW	.31	.59	8	5
WSW	.32	.66	12	12
W	.25	.60	15	26
WNW	.16	.47	4	7
NW	.16	.49	9	8
NNW	.22	.57	4	6
N	.22	.54	0	3

LOCATION 48

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.28	.59	3	2
NE	.36	.63	18	10
ENE	.36	.62	15	13
E	.33	.64	5	4
ESE	.32	.68	4	1
SE	.18	.57	0	0
SSE	.19	.54	0	0
S	.27	.57	1	1
SSW	.33	.62	3	2
SW	.33	.60	8	5
WSW	.32	.66	11	11
W	.23	.61	14	24
WNW	.16	.49	5	9
NW	.15	.50	8	6
NNW	.21	.55	2	3
N	.22	.58	1	5

1993 PHASE I BUILD CONDITION

LOCATION 46

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.49	7	5
NE	.27	.51	26	15
ENE	.25	.49	21	18
E	.17	.42	2	1
ESE	.16	.41	1	0
SE	.19	.54	2	1
SSE	.20	.51	1	1
S	.23	.49	4	4
SSW	.22	.49	6	4
SW	.19	.41	3	2
WSW	.18	.46	5	5
W	.16	.43	8	13
WNW	.14	.36	4	7
NW	.13	.30	1	0
NNW	.17	.44	4	5
N	.17	.51	4	17

LOCATION 47

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.20	.58	8	3
NE	.16	.39	2	0
ENE	.15	.37	1	1
E	.16	.42	1	0
ESE	.17	.43	1	0
SE	.18	.56	1	0
SSE	.16	.41	0	0
S	.17	.40	0	0
SSW	.15	.38	0	0
SW	.21	.46	2	0
WSW	.20	.52	5	1
W	.20	.54	18	15
WNW	.20	.56	53	66
NW	.13	.33	1	0
NNW	.17	.44	1	0
N	.20	.62	7	13

LOCATION 48

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.22	.54	4	2
NE	.26	.53	14	5
ENE	.22	.51	11	7
E	.18	.43	1	0
ESE	.23	.52	2	0
SE	.16	.42	0	0
SSE	.15	.42	0	0
S	.21	.50	1	1
SSW	.27	.54	3	1
SW	.24	.53	8	3
WSW	.24	.52	4	2
W	.18	.46	3	2
WNW	.18	.54	39	58
NW	.13	.33	1	0
NNW	.17	.50	2	2
N	.23	.63	6	16

2000 FULL-BUILD CONDITION

LOCATION 46

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.37	0	0
NE	.16	.41	5	3
ENE	.26	.57	26	27
E	.27	.69	26	28
ESE	.29	.73	14	12
SE	.25	.67	5	3
SSE	.34	.72	5	6
S	.34	.63	11	13
SSW	.24	.54	7	6
SW	.15	.41	1	1
WSW	.13	.30	0	0
W	.13	.29	0	0
WNW	.13	.29	0	0
NW	.12	.25	0	0
NNW	.15	.35	0	0
N	.16	.37	0	1

LOCATION 47

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.13	.29	5	4
NE	.13	.24	6	4
ENE	.13	.28	13	13
E	.13	.32	9	9
ESE	.14	.36	8	5
SE	.15	.38	5	3
SSE	.15	.37	3	3
S	.15	.34	8	8
SSW	.14	.32	9	7
SW	.13	.31	18	15
WSW	.12	.27	3	3
W	.11	.21	1	1
WNW	.12	.22	4	9
NW	.11	.22	5	4
NNW	.12	.22	0	1
N	.12	.25	0	4

LOCATION 48

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.45	2	2
NE	.18	.50	16	10
ENE	.24	.54	21	21
E	.26	.59	12	12
ESE	.29	.69	12	8
SE	.22	.61	3	1
SSE	.19	.55	1	1
S	.21	.49	2	2
SSW	.25	.52	5	4
SW	.20	.47	5	4
WSW	.20	.54	11	13
W	.15	.36	0	1
WNW	.15	.38	3	6
NW	.14	.39	6	5
NNW	.14	.33	0	0
N	.16	.46	0	5

TABLE C-33

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 49

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.28	.60	4	3
NE	.35	.64	21	13
ENE	.36	.63	17	16
E	.30	.57	3	2
ESE	.28	.60	2	0
SE	.21	.64	1	0
SSE	.23	.62	1	1
S	.26	.64	4	4
SSW	.32	.61	3	2
SW	.32	.60	9	7
WSW	.33	.67	13	14
W	.23	.57	8	15
WNW	.17	.46	3	6
NW	.18	.47	6	5
NNW	.20	.56	2	4
N	.23	.55	0	4

LOCATION 50

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.31	.60	3	2
NE	.36	.65	19	11
ENE	.35	.66	18	16
E	.34	.61	4	3
ESE	.30	.59	2	0
SE	.30	.61	0	0
SSE	.21	.58	0	0
S	.26	.61	2	2
SSW	.35	.63	3	2
SW	.33	.61	7	4
WSW	.33	.63	6	5
W	.23	.59	8	14
WNW	.19	.54	11	22
NW	.23	.55	14	15
NNW	.20	.50	0	1
N	.20	.55	0	3

LOCATION 51

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.32	.79	8	5
NE	.39	.83	29	16
ENE	.39	.78	21	18
E	.34	.71	4	3
ESE	.22	.57	0	0
SE	.23	.59	0	0
SSE	.31	.68	0	0
S	.33	.73	3	2
SSW	.20	.51	0	0
SW	.22	.51	0	0
WSW	.16	.40	0	0
W	.19	.52	0	0
WNW	.31	.66	19	36
NW	.28	.63	14	12
NNW	.19	.53	0	0
N	.32	.72	1	7

1993 PHASE I BUILD CONDITION

LOCATION 49

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.23	.51	5	3
NE	.28	.53	20	11
ENE	.24	.50	14	13
E	.17	.41	1	0
ESE	.16	.38	0	0
SE	.17	.47	0	0
SSE	.22	.57	1	1
S	.25	.55	5	4
SSW	.26	.57	9	6
SW	.22	.54	17	12
WSW	.22	.51	6	5
W	.17	.44	4	7
WNW	.16	.44	12	26
NW	.14	.35	2	1
NNW	.16	.41	0	1
N	.17	.50	1	8

LOCATION 50

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.32	.63	9	7
NE	.36	.66	32	19
ENE	.31	.61	20	18
E	.23	.49	1	1
ESE	.16	.40	0	0
SE	.17	.44	0	0
SSE	.24	.56	0	0
S	.29	.64	6	5
SSW	.27	.55	2	2
SW	.21	.53	5	4
WSW	.19	.48	1	1
W	.15	.39	0	0
WNW	.16	.45	5	9
NW	.15	.46	9	8
NNW	.20	.56	6	10
N	.25	.61	3	14

LOCATION 51

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.28	.68	5	3
NE	.37	.76	30	16
ENE	.33	.71	21	16
E	.33	.66	4	3
ESE	.20	.50	0	0
SE	.17	.46	0	0
SSE	.20	.55	0	0
S	.19	.50	0	0
SSW	.19	.51	0	0
SW	.21	.47	0	0
WSW	.18	.44	0	0
W	.19	.48	0	0
WNW	.30	.64	28	51
NW	.21	.54	8	5
NNW	.19	.55	1	1
N	.29	.62	1	4

2000 FULL-BUILD CONDITION

LOCATION 49

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.19	.57	12	9
NE	.17	.42	7	3
ENE	.23	.48	14	12
E	.23	.51	6	5
ESE	.21	.58	6	3
SE	.27	.68	6	3
SSE	.27	.70	4	5
S	.25	.57	7	6
SSW	.23	.55	9	5
SW	.19	.48	8	5
WSW	.15	.39	0	0
W	.15	.36	1	1
WNW	.15	.33	1	1
NW	.14	.32	1	0
NNW	.19	.49	7	11
N	.19	.58	9	27

LOCATION 50

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.16	.41	1	1
NE	.17	.47	12	6
ENE	.31	.57	27	23
E	.23	.50	5	3
ESE	.16	.44	1	0
SE	.17	.50	1	0
SSE	.28	.64	2	2
S	.26	.57	6	5
SSW	.25	.54	6	4
SW	.21	.48	7	4
WSW	.17	.54	13	12
W	.14	.42	3	4
WNW	.14	.35	1	2
NW	.13	.31	1	0
NNW	.16	.45	2	3
N	.21	.60	9	27

LOCATION 51

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT FAL	WEIGHT WINT
NNE	.28	.69	5	3
NE	.38	.80	36	20
ENE	.26	.65	13	11
E	.31	.64	3	2
ESE	.20	.56	1	0
SE	.17	.40	0	0
SSE	.16	.41	0	0
S	.19	.49	0	0
SSW	.19	.47	0	0
SW	.21	.47	0	0
WSW	.17	.43	0	0
W	.19	.50	1	1
WNW	.29	.63	25	45
NW	.22	.58	14	13
NNW	.19	.52	0	0
N	.28	.62	1	4

TABLE C-34

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 1

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.27	.66	17
NE	.20	.53	15
ENE	.19	.49	9
E	.21	.62	14
ESE	.20	.58	4
SE	.34	.82	11
SSE	.25	.73	5
S	.20	.64	11
SSW	.15	.42	0
SW	.14	.34	0
WSW	.17	.45	2
W	.15	.34	0
WNW	.14	.32	0
NW	.14	.33	0
NNW	.16	.38	0
N	.21	.58	11

LOCATION 2

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.29	.59	9
NE	.22	.46	5
ENE	.30	.53	13
E	.36	.58	8
ESE	.37	.63	7
SE	.33	.69	3
SSE	.30	.75	5
S	.24	.66	12
SSW	.23	.52	2
SW	.21	.43	1
WSW	.19	.42	1
W	.18	.37	1
WNW	.19	.42	10
NW	.18	.40	5
NNW	.19	.43	1
N	.26	.62	14

LOCATION 3

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.18	.47	1
NE	.24	.59	14
ENE	.30	.65	23
E	.30	.55	3
ESE	.30	.55	1
SE	.26	.57	0
SSE	.28	.55	0
S	.20	.49	1
SSW	.20	.51	1
SW	.17	.44	0
WSW	.18	.48	1
W	.17	.47	3
WNW	.17	.39	2
NW	.16	.36	0
NNW	.17	.48	1
N	.36	.87	48

1993 PHASE I BUILD CONDITION

LOCATION 1

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.27	.60	12
NE	.16	.44	6
ENE	.16	.45	7
E	.20	.40	1
ESE	.23	.55	3
SE	.35	.79	10
SSE	.32	.79	7
S	.23	.58	7
SSW	.19	.47	1
SW	.17	.40	1
WSW	.18	.47	4
W	.14	.32	0
WNW	.14	.30	0
NW	.21	.44	14
NNW	.24	.51	9
N	.24	.61	17

LOCATION 2

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.23	.52	5
NE	.18	.41	3
ENE	.18	.39	3
E	.22	.39	1
ESE	.22	.47	1
SE	.27	.53	0
SSE	.26	.57	1
S	.24	.58	8
SSW	.23	.50	3
SW	.23	.52	13
WSW	.20	.45	3
W	.19	.39	2
WNW	.17	.38	6
NW	.21	.43	13
NNW	.26	.55	20
N	.25	.59	16

LOCATION 3

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.18	.50	0
NE	.21	.46	0
ENE	.28	.63	4
E	.20	.49	0
ESE	.26	.65	0
SE	.29	.66	0
SSE	.28	.62	0
S	.22	.60	0
SSW	.21	.51	0
SW	.18	.46	0
WSW	.18	.45	0
W	.21	.56	1
WNW	.26	.64	15
NW	.34	.79	42
NNW	.44	.93	36
N	.25	.71	3

2000 FULL-BUILD CONDITION

LOCATION 1

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.27	.65	16
NE	.15	.42	3
ENE	.17	.44	5
E	.18	.43	1
ESE	.22	.53	2
SE	.37	.85	13
SSE	.32	.79	7
S	.23	.62	9
SSW	.20	.47	1
SW	.18	.41	1
WSW	.18	.45	2
W	.14	.33	0
WNW	.14	.32	0
NW	.22	.46	15
NNW	.24	.54	12
N	.24	.60	12

LOCATION 2

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.25	.55	6
NE	.19	.39	2
ENE	.20	.44	5
E	.21	.41	1
ESE	.26	.52	2
SE	.28	.53	0
SSE	.26	.57	1
S	.24	.57	5
SSW	.24	.53	3
SW	.24	.53	13
WSW	.20	.45	2
W	.19	.38	1
WNW	.18	.37	4
NW	.21	.47	19
NNW	.26	.58	24
N	.24	.58	11

LOCATION 3

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.18	.46	0
NE	.18	.38	0
ENE	.24	.50	0
E	.20	.52	0
ESE	.22	.57	0
SE	.19	.45	0
SSE	.22	.51	0
S	.25	.61	0
SSW	.21	.52	0
SW	.24	.61	0
WSW	.18	.43	0
W	.21	.57	1
WNW	.26	.65	13
NW	.37	.85	56
NNW	.43	.90	27
N	.23	.69	2

TABLE C-35

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 4

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.61	2
NE	.31	.71	20
ENE	.37	.74	24
E	.44	.77	13
ESE	.34	.68	3
SE	.23	.61	0
SSE	.25	.70	1
S	.31	.71	5
SSW	.35	.73	8
SW	.29	.63	7
WSW	.27	.62	5
W	.23	.58	9
WNW	.16	.37	0
NW	.17	.42	1
NNW	.16	.38	0
N	.20	.53	1

LOCATION 5

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.29	.66	4
NE	.34	.70	16
ENE	.32	.74	22
E	.21	.62	3
ESE	.21	.67	2
SE	.25	.64	0
SSE	.37	.70	1
S	.37	.71	4
SSW	.36	.81	14
SW	.28	.71	16
WSW	.19	.57	2
W	.17	.51	2
WNW	.17	.41	0
NW	.21	.48	3
NNW	.28	.65	7
N	.32	.68	6

LOCATION 6

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.25	.63	5
NE	.30	.69	24
ENE	.21	.53	7
E	.22	.54	2
ESE	.26	.62	2
SE	.25	.71	1
SSE	.20	.54	0
S	.20	.56	1
SSW	.30	.74	16
SW	.24	.64	16
WSW	.16	.40	0
W	.15	.35	0
WNW	.16	.41	2
NW	.19	.47	6
NNW	.27	.61	10
N	.32	.63	7

1993 PHASE I BUILD CONDITION

LOCATION 4

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.21	.53	0
NE	.29	.63	3
ENE	.42	.84	20
E	.42	.77	5
ESE	.32	.67	0
SE	.22	.45	0
SSE	.26	.52	0
S	.30	.58	0
SSW	.32	.65	0
SW	.29	.62	1
WSW	.28	.62	1
W	.26	.59	2
WNW	.26	.69	27
NW	.31	.75	31
NNW	.36	.75	7
N	.24	.59	0

LOCATION 5

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.28	.62	1
NE	.31	.66	5
ENE	.30	.79	16
E	.31	.79	6
ESE	.24	.63	0
SE	.20	.57	0
SSE	.26	.63	0
S	.24	.58	0
SSW	.26	.67	1
SW	.27	.63	1
WSW	.22	.58	0
W	.27	.64	5
WNW	.27	.69	29
NW	.28	.75	34
NNW	.26	.66	2
N	.31	.64	1

LOCATION 6

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.51	0
NE	.21	.60	9
ENE	.21	.63	13
E	.20	.56	2
ESE	.23	.57	1
SE	.22	.62	0
SSE	.31	.78	2
S	.31	.75	8
SSW	.23	.60	2
SW	.22	.56	3
WSW	.19	.48	0
W	.22	.56	7
WNW	.21	.57	27
NW	.21	.58	20
NNW	.22	.60	5
N	.20	.49	0

2000 FULL-BUILD CONDITION

LOCATION 4

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.22	.54	0
NE	.27	.55	1
ENE	.38	.81	18
E	.35	.74	4
ESE	.28	.62	0
SE	.18	.39	0
SSE	.22	.45	0
S	.28	.54	0
SSW	.31	.63	0
SW	.29	.60	1
WSW	.27	.64	1
W	.25	.60	2
WNW	.25	.66	21
NW	.34	.78	43
NNW	.34	.73	6
N	.23	.57	0

LOCATION 5

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.27	.62	0
NE	.32	.68	5
ENE	.34	.79	14
E	.28	.69	2
ESE	.23	.64	0
SE	.16	.37	0
SSE	.21	.53	0
S	.25	.64	0
SSW	.24	.65	0
SW	.24	.60	0
WSW	.22	.59	0
W	.28	.64	4
WNW	.25	.67	19
NW	.30	.83	52
NNW	.26	.62	1
N	.29	.63	1

LOCATION 6

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.53	0
NE	.24	.65	11
ENE	.28	.64	10
E	.20	.53	1
ESE	.18	.45	0
SE	.17	.42	0
SSE	.23	.58	0
S	.32	.78	8
SSW	.22	.58	1
SW	.20	.52	1
WSW	.18	.47	0
W	.22	.56	5
WNW	.21	.55	14
NW	.23	.70	49
NNW	.19	.49	0
N	.19	.47	0

TABLE C-36

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 7

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.57	5
NE	.25	.66	28
ENE	.22	.57	15
E	.16	.42	0
ESE	.17	.47	0
SE	.25	.57	0
SSE	.31	.61	1
S	.28	.58	4
SSW	.29	.63	9
SW	.20	.55	8
WSW	.15	.39	0
W	.14	.39	0
WNW	.15	.47	18
NW	.17	.44	7
NNW	.14	.36	0
N	.17	.52	3

LOCATION 8

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.15	.35	0
NE	.20	.46	5
ENE	.29	.58	20
E	.28	.62	12
ESE	.26	.63	7
SE	.22	.65	2
SSE	.31	.65	2
S	.33	.59	6
SSW	.33	.66	17
SW	.24	.54	12
WSW	.18	.46	2
W	.17	.48	10
WNW	.15	.36	2
NW	.15	.31	0
NNW	.16	.34	0
N	.15	.31	0

LOCATION 9

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.17	.43	0
NE	.20	.54	6
ENE	.34	.67	21
E	.35	.69	10
ESE	.37	.75	8
SE	.37	.88	6
SSE	.24	.75	2
S	.21	.60	3
SSW	.23	.57	1
SW	.20	.55	4
WSW	.20	.59	7
W	.16	.46	1
WNW	.19	.53	23
NW	.18	.43	2
NNW	.23	.55	3
N	.17	.40	0

1993 PHASE I BUILD CONDITION

LOCATION 7

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.49	0
NE	.27	.70	22
ENE	.34	.73	27
E	.21	.54	1
ESE	.19	.45	0
SE	.20	.48	0
SSE	.22	.60	0
S	.18	.47	0
SSW	.18	.45	0
SW	.17	.43	0
WSW	.17	.44	0
W	.21	.54	6
WNW	.18	.51	13
NW	.22	.59	26
NNW	.20	.52	1
N	.21	.50	1

LOCATION 8

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.14	.31	0
NE	.19	.44	9
ENE	.26	.51	20
E	.24	.54	11
ESE	.24	.55	6
SE	.23	.60	3
SSE	.23	.53	1
S	.18	.41	1
SSW	.16	.35	0
SW	.15	.35	0
WSW	.17	.44	5
W	.19	.46	20
WNW	.17	.40	22
NW	.15	.34	3
NNW	.15	.31	0
N	.14	.28	0

LOCATION 9

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.41	0
NE	.18	.48	5
ENE	.30	.55	12
E	.34	.65	11
ESE	.37	.76	13
SE	.35	.76	4
SSE	.29	.75	3
S	.21	.62	5
SSW	.16	.44	0
SW	.15	.43	0
WSW	.20	.58	11
W	.16	.41	1
WNW	.18	.50	26
NW	.20	.42	3
NNW	.23	.52	4
N	.16	.38	0

2000 FULL-BUILD CONDITION

LOCATION 7

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.48	0
NE	.20	.50	3
ENE	.17	.41	1
E	.16	.36	0
ESE	.18	.45	0
SE	.19	.46	0
SSE	.14	.30	0
S	.15	.36	0
SSW	.17	.41	0
SW	.16	.45	0
WSW	.17	.44	0
W	.22	.53	5
WNW	.19	.55	26
NW	.23	.69	63
NNW	.17	.47	0
N	.21	.52	1

LOCATION 8

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.23	.50	4
NE	.29	.53	18
ENE	.26	.47	10
E	.27	.50	5
ESE	.29	.49	2
SE	.23	.44	0
SSE	.20	.42	0
S	.15	.34	0
SSW	.16	.36	0
SW	.17	.42	2
WSW	.16	.40	1
W	.20	.45	11
WNW	.19	.46	36
NW	.17	.41	10
NNW	.17	.37	0
N	.16	.33	0

LOCATION 9

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.47	1
NE	.27	.57	19
ENE	.29	.55	17
E	.26	.49	3
ESE	.21	.40	0
SE	.22	.52	0
SSE	.19	.48	0
S	.15	.39	0
SSW	.15	.41	0
SW	.16	.46	2
WSW	.20	.57	17
W	.17	.42	3
WNW	.18	.47	29
NW	.17	.41	6
NNW	.19	.44	1
N	.15	.38	0

TABLE C-37

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 10

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.55	2
NE	.29	.65	21
ENE	.31	.62	17
E	.24	.53	2
ESE	.21	.51	0
SE	.21	.49	0
SSE	.23	.54	0
S	.27	.54	1
SSW	.27	.55	1
SW	.24	.55	5
WSW	.19	.57	6
W	.17	.47	3
WNW	.18	.55	39
NW	.15	.37	1
NNW	.15	.38	0
N	.17	.48	1

LOCATION 11

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.18	.47	1
NE	.27	.61	20
ENE	.30	.60	19
E	.26	.54	4
ESE	.23	.52	1
SE	.24	.50	0
SSE	.27	.58	1
S	.31	.56	3
SSW	.30	.57	4
SW	.26	.56	11
WSW	.19	.55	8
W	.17	.48	6
WNW	.17	.48	21
NW	.15	.35	0
NNW	.15	.33	0
N	.15	.36	0

LOCATION 12

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.17	.42	0
NE	.26	.58	15
ENE	.31	.58	16
E	.28	.56	5
ESE	.27	.55	2
SE	.27	.53	0
SSE	.30	.62	1
S	.32	.58	3
SSW	.32	.59	5
SW	.28	.55	9
WSW	.20	.54	6
W	.18	.48	6
WNW	.17	.50	27
NW	.16	.42	4
NNW	.15	.36	0
N	.14	.33	0

1993 PHASE I BUILD CONDITION

LOCATION 10

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.18	.51	2
NE	.21	.52	10
ENE	.22	.53	11
E	.20	.51	3
ESE	.21	.49	1
SE	.23	.54	0
SSE	.28	.64	2
S	.23	.66	9
SSW	.16	.41	0
SW	.15	.34	0
WSW	.17	.52	6
W	.17	.46	4
WNW	.18	.53	49
NW	.17	.40	3
NNW	.16	.35	0
N	.15	.38	0

LOCATION 11

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.42	1
NE	.20	.49	11
ENE	.21	.49	12
E	.22	.50	4
ESE	.26	.52	2
SE	.28	.64	3
SSE	.28	.68	4
S	.20	.59	8
SSW	.16	.35	0
SW	.15	.33	0
WSW	.17	.49	7
W	.18	.43	6
WNW	.19	.47	36
NW	.17	.38	5
NNW	.15	.34	0
N	.15	.34	0

LOCATION 12

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.17	.43	0
NE	.19	.45	4
ENE	.22	.49	7
E	.25	.51	3
ESE	.30	.61	4
SE	.33	.72	3
SSE	.22	.64	2
S	.19	.50	1
SSW	.16	.35	0
SW	.15	.33	0
WSW	.17	.42	1
W	.18	.46	5
WNW	.22	.53	51
NW	.24	.48	17
NNW	.22	.44	1
N	.21	.46	1

2000 FULL-BUILD CONDITION

LOCATION 10

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.18	.52	2
NE	.17	.36	1
ENE	.19	.46	5
E	.23	.49	2
ESE	.20	.49	1
SE	.21	.50	0
SSE	.21	.56	1
S	.16	.43	0
SSW	.14	.28	0
SW	.15	.33	0
WSW	.17	.49	3
W	.17	.43	2
WNW	.21	.56	63
NW	.19	.48	15
NNW	.19	.50	3
N	.19	.49	2

LOCATION 11

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.48	0
NE	.24	.48	3
ENE	.25	.46	2
E	.27	.49	1
ESE	.29	.50	0
SE	.22	.44	0
SSE	.23	.50	0
S	.16	.36	0
SSW	.14	.28	0
SW	.15	.29	0
WSW	.19	.47	0
W	.22	.53	7
WNW	.26	.63	72
NW	.23	.53	14
NNW	.21	.48	1
N	.18	.48	1

LOCATION 12

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.41	1
NE	.14	.33	1
ENE	.13	.26	0
E	.15	.32	0
ESE	.13	.28	0
SE	.13	.26	0
SSE	.12	.23	0
S	.12	.25	0
SSW	.12	.25	0
SW	.13	.26	0
WSW	.14	.33	0
W	.16	.43	5
WNW	.18	.50	58
NW	.18	.48	29
NNW	.18	.49	7
N	.16	.41	1

TABLE C-38

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 13

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.27	.62	5
NE	.27	.58	11
ENE	.29	.57	10
E	.25	.53	2
ESE	.23	.53	1
SE	.26	.57	0
SSE	.31	.62	1
S	.33	.62	3
SSW	.34	.66	7
SW	.29	.62	14
WSW	.20	.50	1
W	.17	.45	2
WNW	.18	.50	17
NW	.19	.53	17
NNW	.15	.39	0
N	.24	.64	8

LOCATION 14

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.56	3
NE	.24	.57	10
ENE	.28	.57	11
E	.24	.53	2
ESE	.20	.48	0
SE	.20	.52	0
SSE	.24	.52	0
S	.29	.56	2
SSW	.33	.70	13
SW	.28	.64	19
WSW	.22	.61	11
W	.19	.58	19
WNW	.15	.35	0
NW	.16	.41	2
NNW	.21	.57	6
N	.22	.56	3

LOCATION 15

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.21	.60	3
NE	.22	.61	12
ENE	.25	.61	12
E	.19	.51	1
ESE	.18	.42	0
SE	.20	.48	0
SSE	.18	.46	0
S	.23	.56	1
SSW	.25	.69	7
SW	.21	.59	6
WSW	.22	.68	17
W	.20	.63	24
WNW	.21	.36	0
NW	.20	.39	1
NNW	.23	.61	8
N	.24	.66	8

1993 PHASE I BUILD CONDITION

LOCATION 13

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.53	2
NE	.16	.43	1
ENE	.17	.42	1
E	.15	.35	0
ESE	.14	.29	0
SE	.15	.32	0
SSE	.15	.33	0
S	.14	.28	0
SSW	.14	.30	0
SW	.14	.30	0
WSW	.16	.38	0
W	.18	.47	2
WNW	.18	.58	54
NW	.22	.55	25
NNW	.23	.59	9
N	.28	.60	6

LOCATION 14

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.24	.52	0
NE	.21	.54	2
ENE	.20	.57	3
E	.18	.46	0
ESE	.24	.59	0
SE	.27	.61	0
SSE	.32	.66	0
S	.30	.60	0
SSW	.28	.60	0
SW	.22	.55	0
WSW	.22	.59	1
W	.26	.69	15
WNW	.26	.70	50
NW	.23	.68	26
NNW	.22	.58	1
N	.29	.58	1

LOCATION 15

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.46	0
NE	.21	.56	4
ENE	.23	.66	12
E	.20	.34	0
ESE	.22	.40	0
SE	.23	.37	0
SSE	.21	.41	0
S	.19	.38	0
SSW	.18	.42	0
SW	.18	.43	0
WSW	.22	.62	4
W	.25	.60	8
WNW	.23	.62	33
NW	.23	.67	35
NNW	.22	.63	4
N	.20	.54	1

2000 FULL-BUILD CONDITION

LOCATION 13

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.21	.53	2
NE	.15	.36	0
ENE	.13	.26	0
E	.14	.28	0
ESE	.14	.30	0
SE	.14	.31	0
SSE	.14	.27	0
S	.13	.25	0
SSW	.14	.29	0
SW	.14	.30	0
WSW	.15	.38	0
W	.19	.45	3
WNW	.19	.53	37
NW	.23	.59	47
NNW	.22	.56	8
N	.22	.54	3

LOCATION 14

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.21	.48	0
NE	.24	.59	2
ENE	.30	.59	3
E	.19	.44	0
ESE	.17	.45	0
SE	.21	.46	0
SSE	.25	.56	0
S	.31	.60	0
SSW	.25	.60	0
SW	.20	.49	0
WSW	.21	.57	0
W	.26	.71	11
WNW	.24	.72	38
NW	.25	.80	45
NNW	.23	.53	0
N	.28	.56	0

LOCATION 15

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.44	0
NE	.21	.57	4
ENE	.22	.62	8
E	.19	.50	0
ESE	.21	.36	0
SE	.23	.35	0
SSE	.22	.35	0
S	.21	.38	0
SSW	.19	.38	0
SW	.17	.42	0
WSW	.20	.60	3
W	.22	.60	7
WNW	.21	.59	23
NW	.25	.71	49
NNW	.22	.62	4
N	.19	.56	1

TABLE C-39

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 16

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.56	2
NE	.27	.63	15
ENE	.36	.65	18
E	.34	.61	5
ESE	.28	.57	1
SE	.20	.58	0
SSE	.23	.53	0
S	.28	.61	3
SSW	.31	.65	5
SW	.26	.60	8
WSW	.27	.70	25
W	.19	.57	12
WNW	.14	.41	2
NW	.15	.42	2
NNW	.16	.45	0
N	.18	.52	1

LOCATION 17

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.17	.50	1
NE	.26	.62	18
ENE	.35	.63	20
E	.33	.58	5
ESE	.32	.60	2
SE	.24	.60	0
SSE	.28	.56	0
S	.25	.59	3
SSW	.28	.61	5
SW	.22	.55	6
WSW	.20	.49	1
W	.16	.42	1
WNW	.15	.39	2
NW	.16	.40	2
NNW	.17	.49	1
N	.31	.79	31

LOCATION 18

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.51	2
NE	.25	.59	18
ENE	.33	.60	20
E	.28	.55	4
ESE	.27	.54	1
SE	.22	.51	0
SSE	.28	.57	1
S	.24	.57	3
SSW	.27	.64	10
SW	.20	.54	8
WSW	.20	.51	4
W	.17	.42	2
WNW	.14	.37	1
NW	.14	.38	2
NNW	.16	.53	6
N	.24	.66	16

1993 PHASE I BUILD CONDITION

LOCATION 16

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.11	.23	0
NE	.11	.23	0
ENE	.15	.45	20
E	.15	.38	2
ESE	.12	.29	0
SE	.12	.28	0
SSE	.16	.40	0
S	.15	.42	3
SSW	.12	.33	0
SW	.12	.26	0
WSW	.12	.30	0
W	.14	.37	9
WNW	.14	.36	21
NW	.15	.41	38
NNW	.14	.40	6
N	.12	.28	0

LOCATION 17

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.17	.48	0
NE	.16	.38	0
ENE	.25	.59	3
E	.20	.45	0
ESE	.19	.56	0
SE	.27	.62	0
SSE	.40	.69	0
S	.47	.82	5
SSW	.36	.83	8
SW	.32	.87	31
WSW	.20	.56	0
W	.19	.52	0
WNW	.19	.51	2
NW	.28	.70	26
NNW	.40	.82	21
N	.31	.67	2

LOCATION 18

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.17	.50	0
NE	.16	.44	0
ENE	.19	.54	2
E	.27	.67	3
ESE	.40	.85	6
SE	.29	.65	0
SSE	.32	.65	0
S	.28	.66	1
SSW	.30	.72	3
SW	.36	.80	23
WSW	.20	.62	2
W	.18	.55	2
WNW	.21	.54	6
NW	.30	.69	29
NNW	.37	.78	19
N	.26	.65	2

2000 FULL-BUILD CONDITION

LOCATION 16

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.11	.22	0
NE	.11	.23	0
ENE	.13	.36	6
E	.14	.42	5
ESE	.11	.25	0
SE	.12	.26	0
SSE	.14	.38	0
S	.18	.46	6
SSW	.13	.36	1
SW	.12	.29	0
WSW	.12	.32	0
W	.14	.37	8
WNW	.14	.37	25
NW	.16	.43	46
NNW	.14	.38	3
N	.11	.25	0

LOCATION 17

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.46	0
NE	.14	.34	0
ENE	.20	.49	1
E	.17	.48	0
ESE	.20	.60	0
SE	.23	.53	0
SSE	.34	.57	0
S	.45	.73	2
SSW	.36	.75	3
SW	.42	.89	41
WSW	.20	.60	1
W	.18	.49	0
WNW	.20	.56	7
NW	.32	.69	26
NNW	.40	.78	16
N	.28	.65	2

LOCATION 18

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.17	.45	0
NE	.13	.36	0
ENE	.16	.44	0
E	.23	.62	2
ESE	.27	.66	1
SE	.18	.46	0
SSE	.19	.48	0
S	.24	.58	0
SSW	.25	.63	1
SW	.40	.79	21
WSW	.22	.64	3
W	.18	.53	1
WNW	.21	.59	14
NW	.33	.72	39
NNW	.37	.76	16
N	.24	.62	2

TABLE C-40

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 19

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.50	3
NE	.23	.54	15
ENE	.30	.56	18
E	.26	.50	3
ESE	.27	.54	2
SE	.21	.49	0
SSE	.26	.57	1
S	.21	.62	8
SSW	.22	.62	13
SW	.17	.46	3
WSW	.20	.52	8
W	.17	.44	5
WNW	.13	.31	0
NW	.14	.37	2
NNW	.14	.43	1
N	.22	.63	17

LOCATION 20

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.24	.63	7
NE	.27	.58	13
ENE	.33	.60	16
E	.30	.55	3
ESE	.27	.57	1
SE	.27	.55	0
SSE	.28	.65	1
S	.21	.68	8
SSW	.20	.55	2
SW	.17	.48	1
WSW	.23	.59	10
W	.23	.55	14
WNW	.16	.42	4
NW	.15	.37	1
NNW	.15	.40	0
N	.30	.72	19

LOCATION 21

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.25	.61	4
NE	.25	.56	8
ENE	.30	.55	9
E	.27	.51	1
ESE	.22	.54	1
SE	.25	.60	0
SSE	.24	.67	1
S	.21	.64	4
SSW	.19	.49	0
SW	.16	.44	0
WSW	.24	.65	16
W	.27	.66	41
WNW	.18	.44	5
NW	.14	.35	0
NNW	.15	.40	0
N	.24	.65	9

1993 PHASE I BUILD CONDITION

LOCATION 19

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.52	1
NE	.12	.31	0
ENE	.13	.33	0
E	.14	.29	0
ESE	.18	.34	0
SE	.13	.26	0
SSE	.14	.29	0
S	.14	.31	0
SSW	.13	.38	0
SW	.12	.29	0
WSW	.13	.33	0
W	.13	.31	0
WNW	.14	.38	0
NW	.24	.61	33
NNW	.33	.79	53
N	.22	.72	14

LOCATION 20

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.25	.56	4
NE	.15	.35	0
ENE	.15	.35	0
E	.13	.27	0
ESE	.15	.31	0
SE	.18	.43	0
SSE	.30	.65	2
S	.26	.62	6
SSW	.26	.59	5
SW	.26	.63	28
WSW	.24	.58	12
W	.19	.46	4
WNW	.14	.40	3
NW	.18	.43	5
NNW	.21	.55	8
N	.33	.70	21

LOCATION 21

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.26	.61	11
NE	.14	.35	1
ENE	.14	.32	0
E	.17	.37	0
ESE	.17	.43	0
SE	.28	.57	1
SSE	.31	.72	4
S	.19	.55	4
SSW	.19	.50	2
SW	.18	.47	4
WSW	.20	.56	15
W	.20	.50	17
WNW	.13	.36	3
NW	.16	.43	10
NNW	.18	.49	5
N	.29	.64	20

2000 FULL-BUILD CONDITION

LOCATION 19

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.15	.47	0
NE	.12	.28	0
ENE	.12	.32	0
E	.12	.27	0
ESE	.14	.30	0
SE	.13	.25	0
SSE	.13	.27	0
S	.13	.28	0
SSW	.13	.34	0
SW	.12	.26	0
WSW	.12	.31	0
W	.13	.33	0
WNW	.14	.39	1
NW	.26	.65	51
NNW	.34	.75	41
N	.21	.66	8

LOCATION 20

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.26	.57	5
NE	.13	.29	0
ENE	.15	.37	1
E	.13	.30	0
ESE	.16	.34	0
SE	.21	.52	0
SSE	.32	.67	2
S	.28	.67	10
SSW	.26	.57	4
SW	.27	.61	22
WSW	.23	.56	10
W	.18	.45	4
WNW	.14	.37	2
NW	.18	.46	10
NNW	.21	.55	9
N	.32	.69	20

LOCATION 21

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.25	.59	9
NE	.13	.33	0
ENE	.14	.33	0
E	.15	.34	0
ESE	.18	.42	0
SE	.31	.70	4
SSE	.31	.70	4
S	.19	.57	5
SSW	.19	.48	1
SW	.19	.48	4
WSW	.19	.52	8
W	.20	.54	28
WNW	.14	.33	1
NW	.16	.42	7
NNW	.18	.52	8
N	.28	.66	21

TABLE C-41

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 22

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.21	.58	1
NE	.28	.60	7
ENE	.32	.59	7
E	.31	.62	3
ESE	.20	.54	0
SE	.29	.60	0
SSE	.39	.75	1
S	.34	.79	8
SSW	.24	.60	1
SW	.23	.63	5
WSW	.29	.72	15
W	.29	.74	41
WNW	.16	.48	3
NW	.14	.40	0
NNW	.15	.48	0
N	.30	.70	7

LOCATION 23

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.23	.60	3
NE	.31	.60	9
ENE	.30	.52	4
E	.26	.57	2
ESE	.15	.45	0
SE	.28	.59	0
SSE	.33	.63	1
S	.36	.66	4
SSW	.34	.71	8
SW	.24	.56	3
WSW	.23	.58	4
W	.19	.69	40
WNW	.15	.47	5
NW	.15	.43	2
NNW	.18	.58	4
N	.28	.71	11

LOCATION 24

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.29	.57	1
NE	.37	.64	12
ENE	.38	.62	10
E	.35	.65	5
ESE	.21	.48	0
SE	.32	.64	0
SSE	.36	.66	1
S	.39	.65	3
SSW	.38	.64	2
SW	.32	.58	3
WSW	.30	.63	6
W	.24	.70	34
WNW	.20	.50	7
NW	.20	.49	4
NNW	.24	.63	6
N	.30	.67	6

1993 PHASE I BUILD CONDITION

LOCATION 22

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.11	.23	0
NE	.11	.21	0
ENE	.11	.22	0
E	.12	.22	0
ESE	.13	.33	0
SE	.17	.40	0
SSE	.24	.50	2
S	.26	.60	22
SSW	.18	.52	14
SW	.15	.41	7
WSW	.16	.44	10
W	.16	.44	26
WNW	.13	.37	20
NW	.12	.25	0
NNW	.11	.25	0
N	.12	.25	0

LOCATION 23

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.12	.29	0
NE	.12	.23	0
ENE	.13	.32	0
E	.22	.52	2
ESE	.22	.54	1
SE	.24	.49	0
SSE	.19	.46	0
S	.16	.45	0
SSW	.19	.49	0
SW	.19	.48	1
WSW	.24	.65	19
W	.26	.70	66
WNW	.15	.46	9
NW	.13	.38	1
NNW	.12	.24	0
N	.12	.27	0

LOCATION 24

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.17	.37	2
NE	.18	.40	13
ENE	.21	.45	23
E	.25	.56	30
ESE	.25	.59	21
SE	.18	.36	0
SSE	.16	.33	0
S	.18	.31	0
SSW	.18	.31	0
SW	.16	.32	1
WSW	.16	.33	1
W	.17	.32	3
WNW	.15	.28	3
NW	.14	.24	0
NNW	.15	.26	0
N	.15	.29	0

2000 FULL-BUILD CONDITION

LOCATION 22

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.12	.22	0
NE	.11	.21	0
ENE	.11	.20	0
E	.12	.23	0
ESE	.13	.34	0
SE	.20	.48	1
SSE	.25	.51	2
S	.25	.60	22
SSW	.18	.57	25
SW	.15	.43	9
WSW	.16	.44	11
W	.16	.43	20
WNW	.12	.34	9
NW	.12	.28	1
NNW	.12	.24	0
N	.12	.25	0

LOCATION 23

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.12	.25	0
NE	.12	.30	0
ENE	.16	.42	1
E	.26	.52	2
ESE	.31	.64	4
SE	.30	.62	0
SSE	.21	.49	0
S	.17	.46	0
SSW	.20	.51	1
SW	.19	.50	2
WSW	.23	.65	20
W	.26	.69	63
WNW	.15	.43	5
NW	.13	.39	1
NNW	.12	.27	0
N	.11	.25	0

LOCATION 24

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.31	0
NE	.19	.39	9
ENE	.25	.51	33
E	.27	.58	28
ESE	.30	.63	24
SE	.18	.40	0
SSE	.16	.32	0
S	.17	.30	0
SSW	.18	.30	0
SW	.17	.34	1
WSW	.16	.31	0
W	.15	.31	1
WNW	.14	.27	1
NW	.14	.24	0
NNW	.14	.25	0
N	.14	.24	0

TABLE C-42

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 25

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.24	.57	2
NE	.34	.64	14
ENE	.34	.56	7
E	.31	.58	3
ESE	.20	.50	0
SE	.25	.57	0
SSE	.32	.60	0
S	.36	.63	2
SSW	.34	.64	3
SW	.28	.57	4
WSW	.27	.62	7
W	.24	.67	33
WNW	.17	.49	7
NW	.16	.48	5
NNW	.20	.59	4
N	.24	.69	9

LOCATION 26

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.25	.57	3
NE	.34	.62	19
ENE	.34	.59	15
E	.31	.62	7
ESE	.27	.61	3
SE	.18	.51	0
SSE	.26	.57	1
S	.26	.53	1
SSW	.23	.51	1
SW	.20	.46	1
WSW	.22	.56	7
W	.19	.58	22
WNW	.14	.41	3
NW	.15	.45	6
NNW	.18	.54	5
N	.18	.58	5

LOCATION 27

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.26	.57	2
NE	.36	.65	15
ENE	.38	.64	14
E	.33	.65	5
ESE	.31	.70	4
SE	.20	.57	0
SSE	.26	.62	0
S	.34	.63	2
SSW	.34	.62	2
SW	.31	.59	5
WSW	.31	.68	16
W	.24	.64	23
WNW	.15	.44	2
NW	.16	.49	5
NNW	.19	.54	2
N	.19	.51	1

1993 PHASE I BUILD CONDITION

LOCATION 25

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.12	.27	0
NE	.13	.30	4
ENE	.15	.37	16
E	.18	.48	23
ESE	.19	.52	18
SE	.13	.34	0
SSE	.15	.40	1
S	.21	.47	15
SSW	.18	.43	12
SW	.16	.34	6
WSW	.16	.31	2
W	.12	.25	0
WNW	.11	.21	0
NW	.12	.21	0
NNW	.11	.20	0
N	.12	.26	0

LOCATION 26

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.18	.51	4
NE	.23	.55	20
ENE	.26	.60	30
E	.23	.58	11
ESE	.24	.61	7
SE	.16	.50	0
SSE	.16	.41	0
S	.13	.28	0
SSW	.12	.27	0
SW	.12	.28	0
WSW	.12	.23	0
W	.12	.25	0
WNW	.15	.44	26
NW	.12	.29	0
NNW	.14	.36	0
N	.15	.42	1

LOCATION 27

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.21	.54	1
NE	.21	.49	3
ENE	.20	.50	4
E	.19	.49	1
ESE	.24	.55	1
SE	.18	.52	0
SSE	.21	.46	0
S	.21	.49	0
SSW	.18	.50	0
SW	.17	.39	0
WSW	.17	.39	0
W	.16	.49	3
WNW	.21	.64	78
NW	.16	.44	3
NNW	.17	.47	0
N	.21	.60	5

2000 FULL-BUILD CONDITION

LOCATION 25

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.12	.28	0
NE	.15	.35	3
ENE	.24	.53	30
E	.26	.64	33
ESE	.31	.70	29
SE	.14	.40	0
SSE	.15	.42	0
S	.19	.46	4
SSW	.17	.37	0
SW	.16	.35	1
WSW	.14	.29	0
W	.12	.25	0
WNW	.11	.22	0
NW	.12	.23	0
NNW	.11	.21	0
N	.12	.22	0

LOCATION 26

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.14	.41	0
NE	.15	.38	1
ENE	.23	.53	11
E	.29	.59	7
ESE	.31	.65	6
SE	.20	.54	0
SSE	.19	.48	0
S	.14	.39	0
SSW	.18	.52	2
SW	.28	.64	33
WSW	.22	.61	19
W	.14	.42	2
WNW	.17	.46	16
NW	.15	.39	3
NNW	.13	.35	0
N	.12	.29	0

LOCATION 27

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.15	.38	0
NE	.20	.47	2
ENE	.33	.65	16
E	.36	.70	9
ESE	.40	.80	10
SE	.21	.60	0
SSE	.18	.53	0
S	.17	.45	0
SSW	.23	.61	2
SW	.32	.74	33
WSW	.29	.74	28
W	.15	.50	2
WNW	.13	.37	0
NW	.13	.35	0
NNW	.13	.32	0
N	.13	.33	0

TABLE C-43

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 28

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.24	.53	1
NE	.33	.60	11
ENE	.34	.60	12
E	.32	.55	2
ESE	.31	.59	1
SE	.23	.54	0
SSE	.29	.57	0
S	.36	.64	3
SSW	.30	.59	2
SW	.29	.57	5
WSW	.32	.68	19
W	.29	.63	25
WNW	.19	.46	6
NW	.18	.43	2
NNW	.21	.55	3
N	.23	.62	6

LOCATION 29

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.54	1
NE	.29	.60	11
ENE	.33	.59	11
E	.29	.57	3
ESE	.30	.61	2
SE	.23	.56	0
SSE	.31	.60	0
S	.31	.69	6
SSW	.30	.62	3
SW	.28	.62	10
WSW	.29	.68	19
W	.24	.61	20
WNW	.15	.39	1
NW	.15	.42	1
NNW	.17	.53	2
N	.22	.67	10

LOCATION 30

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.52	2
NE	.25	.60	16
ENE	.33	.61	17
E	.30	.57	4
ESE	.32	.62	3
SE	.22	.60	0
SSE	.28	.57	0
S	.27	.62	4
SSW	.29	.63	6
SW	.22	.56	7
WSW	.23	.59	11
W	.19	.51	8
WNW	.14	.36	1
NW	.14	.44	5
NNW	.15	.48	1
N	.25	.69	16

1993 PHASE I BUILD CONDITION

LOCATION 28

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.18	.42	0
NE	.17	.41	2
ENE	.17	.44	3
E	.20	.50	2
ESE	.23	.54	1
SE	.18	.53	0
SSE	.18	.44	0
S	.17	.35	0
SSW	.19	.41	0
SW	.32	.66	36
WSW	.23	.53	6
W	.20	.43	2
WNW	.22	.51	34
NW	.18	.45	9
NNW	.20	.51	4
N	.17	.39	0

LOCATION 29

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.15	.39	0
NE	.26	.57	9
ENE	.43	.77	37
E	.47	.76	18
ESE	.48	.79	11
SE	.28	.66	1
SSE	.24	.55	0
S	.14	.33	0
SSW	.15	.34	0
SW	.20	.43	0
WSW	.20	.41	0
W	.16	.36	0
WNW	.15	.34	0
NW	.20	.50	10
NNW	.28	.61	10
N	.23	.59	4

LOCATION 30

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.45	0
NE	.17	.49	2
ENE	.19	.60	8
E	.17	.56	1
ESE	.19	.70	3
SE	.22	.66	0
SSE	.23	.65	1
S	.18	.43	0
SSW	.17	.44	0
SW	.21	.50	0
WSW	.18	.47	0
W	.15	.39	0
WNW	.16	.43	1
NW	.19	.69	49
NNW	.24	.77	30
N	.21	.65	5

2000 FULL-BUILD CONDITION

LOCATION 28

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.51	1
NE	.25	.53	8
ENE	.36	.69	31
E	.38	.74	21
ESE	.36	.70	7
SE	.20	.53	0
SSE	.21	.42	0
S	.24	.45	0
SSW	.22	.47	0
SW	.22	.51	3
WSW	.19	.47	1
W	.18	.44	2
WNW	.19	.42	4
NW	.18	.48	12
NNW	.21	.53	4
N	.20	.54	3

LOCATION 29

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.14	.35	0
NE	.18	.51	3
ENE	.35	.74	28
E	.46	.86	26
ESE	.49	.91	19
SE	.20	.56	0
SSE	.14	.36	0
S	.13	.25	0
SSW	.14	.29	0
SW	.17	.38	0
WSW	.17	.37	0
W	.15	.33	0
WNW	.15	.36	0
NW	.22	.56	17
NNW	.28	.59	5
N	.20	.54	1

LOCATION 30

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.15	.43	0
NE	.14	.41	0
ENE	.17	.44	0
E	.21	.64	2
ESE	.22	.68	1
SE	.16	.48	0
SSE	.20	.55	0
S	.26	.61	1
SSW	.17	.47	0
SW	.20	.50	0
WSW	.17	.44	0
W	.15	.42	0
WNW	.16	.46	1
NW	.22	.79	66
NNW	.23	.81	26
N	.21	.67	3

TABLE C-44

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 31

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.21	.55	2
NE	.31	.64	17
ENE	.33	.62	14
E	.30	.58	3
ESE	.31	.62	2
SE	.22	.62	0
SSE	.28	.59	0
S	.33	.64	4
SSW	.28	.59	2
SW	.29	.62	11
WSW	.30	.66	17
W	.23	.58	14
WNW	.15	.40	1
NW	.15	.44	3
NNW	.17	.54	2
N	.21	.62	6

LOCATION 32

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.18	.49	1
NE	.26	.58	11
ENE	.30	.58	11
E	.29	.56	3
ESE	.32	.62	2
SE	.21	.63	0
SSE	.28	.61	1
S	.35	.65	5
SSW	.29	.61	3
SW	.29	.62	13
WSW	.30	.69	26
W	.24	.58	18
WNW	.15	.41	2
NW	.15	.43	3
NNW	.16	.48	1
N	.18	.52	1

LOCATION 33

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.21	.54	2
NE	.30	.60	17
ENE	.31	.57	13
E	.29	.55	3
ESE	.28	.59	2
SE	.18	.58	0
SSE	.24	.54	0
S	.31	.61	4
SSW	.29	.60	4
SW	.29	.60	15
WSW	.26	.63	17
W	.18	.50	6
WNW	.15	.41	4
NW	.15	.42	3
NNW	.17	.53	4
N	.19	.54	3

1993 PHASE I BUILD CONDITION

LOCATION 31

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.18	.49	0
NE	.24	.51	1
ENE	.38	.71	11
E	.41	.73	4
ESE	.42	.77	3
SE	.32	.71	0
SSE	.31	.69	0
S	.22	.54	0
SSW	.19	.49	0
SW	.34	.77	15
WSW	.37	.74	9
W	.29	.63	6
WNW	.28	.66	31
NW	.19	.57	6
NNW	.27	.76	12
N	.24	.65	2

LOCATION 32

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.55	0
NE	.17	.43	0
ENE	.25	.58	3
E	.28	.63	1
ESE	.25	.62	0
SE	.21	.60	0
SSE	.20	.58	0
S	.21	.54	0
SSW	.21	.53	0
SW	.40	.84	28
WSW	.35	.90	37
W	.22	.75	26
WNW	.16	.52	3
NW	.13	.30	0
NNW	.13	.31	0
N	.18	.54	0

LOCATION 33

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.14	.37	7
NE	.14	.32	8
ENE	.13	.26	3
E	.15	.36	6
ESE	.16	.40	5
SE	.16	.40	1
SSE	.16	.38	1
S	.19	.47	18
SSW	.15	.42	14
SW	.15	.38	22
WSW	.14	.35	8
W	.13	.27	2
WNW	.13	.24	3
NW	.13	.23	1
NNW	.12	.24	0
N	.13	.25	0

2000 FULL-BUILD CONDITION

LOCATION 31

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.15	.41	0
NE	.23	.51	1
ENE	.33	.67	10
E	.27	.64	2
ESE	.39	.80	5
SE	.28	.67	0
SSE	.28	.75	1
S	.25	.51	0
SSW	.24	.51	0
SW	.26	.63	3
WSW	.27	.60	1
W	.28	.66	12
WNW	.25	.60	18
NW	.24	.71	38
NNW	.24	.71	9
N	.18	.49	0

LOCATION 32

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.17	.50	1
NE	.17	.45	2
ENE	.23	.59	11
E	.23	.62	5
ESE	.29	.71	5
SE	.23	.65	0
SSE	.22	.63	1
S	.21	.52	1
SSW	.26	.53	1
SW	.27	.54	3
WSW	.24	.52	2
W	.23	.59	18
WNW	.22	.58	41
NW	.16	.38	0
NNW	.18	.48	0
N	.22	.66	9

LOCATION 33

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.14	.30	1
NE	.13	.27	1
ENE	.15	.33	7
E	.17	.47	18
ESE	.23	.55	22
SE	.18	.43	1
SSE	.19	.49	4
S	.15	.40	5
SSW	.14	.28	0
SW	.14	.28	0
WSW	.14	.27	0
W	.13	.30	3
WNW	.15	.33	27
NW	.14	.25	1
NNW	.16	.31	2
N	.16	.36	4

TABLE C-45

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 34

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.23	.54	2
NE	.33	.63	17
ENE	.33	.63	17
E	.29	.57	4
ESE	.30	.59	2
SE	.18	.59	0
SSE	.22	.54	0
S	.31	.58	2
SSW	.29	.58	2
SW	.28	.57	7
WSW	.29	.64	15
W	.22	.56	14
WNW	.16	.45	6
NW	.15	.42	2
NNW	.20	.57	7
N	.19	.53	2

LOCATION 35

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.27	.57	2
NE	.36	.65	18
ENE	.35	.62	15
E	.31	.58	3
ESE	.26	.57	1
SE	.21	.60	0
SSE	.26	.58	0
S	.32	.63	3
SSW	.30	.59	2
SW	.32	.61	11
WSW	.30	.65	15
W	.19	.49	3
WNW	.16	.48	9
NW	.16	.44	3
NNW	.24	.61	10
N	.22	.56	3

LOCATION 36

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.21	.55	2
NE	.30	.62	17
ENE	.31	.61	16
E	.31	.58	4
ESE	.26	.53	1
SE	.22	.61	0
SSE	.26	.62	1
S	.30	.59	3
SSW	.31	.58	3
SW	.27	.58	9
WSW	.27	.60	10
W	.19	.52	8
WNW	.15	.44	6
NW	.17	.47	8
NNW	.20	.56	7
N	.22	.57	5

1993 PHASE I BUILD CONDITION

LOCATION 34

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.28	.78	15
NE	.20	.54	5
ENE	.26	.62	12
E	.27	.62	4
ESE	.28	.70	4
SE	.24	.73	1
SSE	.25	.71	1
S	.29	.66	4
SSW	.21	.48	0
SW	.30	.64	12
WSW	.31	.69	18
W	.24	.60	14
WNW	.17	.47	6
NW	.14	.35	0
NNW	.16	.44	0
N	.18	.59	3

LOCATION 35

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.30	.65	6
NE	.26	.62	15
ENE	.27	.62	16
E	.24	.65	8
ESE	.31	.76	9
SE	.29	.73	2
SSE	.35	.74	2
S	.40	.76	12
SSW	.29	.70	10
SW	.25	.53	3
WSW	.19	.52	2
W	.19	.50	4
WNW	.17	.46	6
NW	.17	.42	2
NNW	.15	.42	0
N	.17	.52	1

LOCATION 36

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.64	6
NE	.20	.61	13
ENE	.30	.65	19
E	.32	.73	14
ESE	.28	.74	8
SE	.30	.80	4
SSE	.26	.71	2
S	.34	.74	10
SSW	.29	.75	17
SW	.17	.46	0
WSW	.16	.39	0
W	.14	.38	0
WNW	.15	.43	3
NW	.15	.37	0
NNW	.16	.45	0
N	.19	.56	3

2000 FULL-BUILD CONDITION

LOCATION 34

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.13	.27	1
NE	.13	.25	2
ENE	.14	.31	12
E	.14	.34	6
ESE	.17	.48	22
SE	.15	.36	1
SSE	.15	.36	1
S	.14	.31	2
SSW	.13	.26	0
SW	.13	.24	0
WSW	.13	.27	1
W	.14	.30	14
WNW	.14	.29	28
NW	.14	.25	6
NNW	.13	.24	0
N	.13	.29	2

LOCATION 35

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.30	.61	6
NE	.24	.59	17
ENE	.23	.54	10
E	.23	.62	9
ESE	.38	.83	20
SE	.31	.73	3
SSE	.34	.70	2
S	.25	.63	6
SSW	.20	.49	0
SW	.21	.46	1
WSW	.17	.42	0
W	.15	.41	1
WNW	.18	.45	11
NW	.16	.41	3
NNW	.23	.51	3
N	.27	.57	6

LOCATION 36

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.18	.53	3
NE	.21	.59	18
ENE	.16	.43	3
E	.18	.52	3
ESE	.23	.59	3
SE	.26	.64	1
SSE	.40	.76	4
S	.33	.75	18
SSW	.20	.51	1
SW	.16	.34	0
WSW	.15	.38	0
W	.16	.52	13
WNW	.17	.50	31
NW	.16	.37	1
NNW	.16	.40	0
N	.17	.46	1

TABLE C-46

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 37

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.23	.54	1
NE	.32	.62	14
ENE	.32	.59	12
E	.31	.58	3
ESE	.29	.60	2
SE	.30	.62	0
SSE	.30	.65	1
S	.32	.60	2
SSW	.32	.60	2
SW	.31	.58	6
WSW	.24	.57	5
W	.17	.51	5
WNW	.16	.52	20
NW	.20	.56	22
NNW	.16	.46	0
N	.23	.55	2

LOCATION 38

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.25	.61	2
NE	.33	.68	17
ENE	.32	.61	10
E	.33	.59	3
ESE	.31	.62	1
SE	.29	.60	0
SSE	.27	.62	0
S	.32	.63	2
SSW	.33	.62	2
SW	.32	.58	3
WSW	.26	.57	3
W	.18	.51	3
WNW	.21	.61	41
NW	.21	.54	11
NNW	.20	.52	1
N	.20	.54	1

LOCATION 39

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.26	.60	6
NE	.33	.62	21
ENE	.28	.55	12
E	.20	.50	2
ESE	.21	.50	1
SE	.25	.56	0
SSE	.25	.61	1
S	.31	.63	6
SSW	.31	.59	4
SW	.29	.59	13
WSW	.20	.52	4
W	.17	.51	9
WNW	.17	.48	19
NW	.14	.36	1
NNW	.16	.46	1
N	.19	.49	1

1993 PHASE I BUILD CONDITION

LOCATION 37

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.62	4
NE	.32	.78	37
ENE	.28	.65	17
E	.22	.58	3
ESE	.24	.64	2
SE	.27	.71	1
SSE	.34	.79	3
S	.38	.76	11
SSW	.36	.79	21
SW	.22	.49	1
WSW	.15	.39	0
W	.13	.29	0
WNW	.13	.30	0
NW	.13	.27	0
NNW	.14	.35	0
N	.16	.43	0

LOCATION 38

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.34	.70	9
NE	.37	.70	24
ENE	.25	.56	8
E	.17	.41	0
ESE	.23	.73	6
SE	.29	.79	3
SSE	.36	.75	2
S	.35	.71	7
SSW	.33	.72	11
SW	.22	.49	1
WSW	.18	.53	2
W	.16	.44	1
WNW	.16	.44	3
NW	.14	.40	1
NNW	.28	.62	10
N	.35	.70	12

LOCATION 39

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.23	.58	5
NE	.26	.56	13
ENE	.20	.50	7
E	.18	.45	1
ESE	.23	.50	1
SE	.27	.57	0
SSE	.40	.79	5
S	.38	.76	18
SSW	.27	.65	10
SW	.19	.51	4
WSW	.15	.41	0
W	.17	.46	4
WNW	.20	.50	28
NW	.16	.42	4
NNW	.17	.43	0
N	.17	.48	1

2000 FULL-BUILD CONDITION

LOCATION 37

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.15	.43	8
NE	.13	.32	4
ENE	.13	.28	2
E	.13	.30	1
ESE	.15	.37	1
SE	.16	.40	0
SSE	.19	.48	2
S	.21	.49	12
SSW	.16	.41	5
SW	.13	.26	0
WSW	.13	.26	0
W	.14	.37	16
WNW	.14	.35	28
NW	.14	.33	12
NNW	.14	.34	2
N	.15	.40	6

LOCATION 38

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.14	.33	4
NE	.13	.30	7
ENE	.16	.37	21
E	.18	.40	13
ESE	.15	.33	2
SE	.13	.27	0
SSE	.14	.31	0
S	.15	.33	2
SSW	.14	.29	1
SW	.12	.23	0
WSW	.12	.22	0
W	.15	.35	30
WNW	.14	.29	20
NW	.12	.21	1
NNW	.12	.23	0
N	.12	.24	0

LOCATION 39

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.38	0
NE	.19	.42	1
ENE	.20	.44	2
E	.25	.49	1
ESE	.25	.54	1
SE	.26	.55	0
SSE	.23	.57	0
S	.19	.48	0
SSW	.13	.30	0
SW	.13	.27	0
WSW	.16	.40	0
W	.20	.51	7
WNW	.26	.60	75
NW	.20	.49	11
NNW	.20	.45	0
N	.18	.42	0

TABLE C-47

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 40

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.25	.57	3
NE	.28	.60	14
ENE	.28	.56	11
E	.22	.52	2
ESE	.28	.57	1
SE	.30	.57	0
SSE	.28	.62	1
S	.31	.63	4
SSW	.32	.61	4
SW	.30	.57	8
WSW	.22	.54	4
W	.18	.52	9
WNW	.19	.54	33
NW	.15	.43	3
NNW	.16	.44	0
N	.18	.48	1

LOCATION 41

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.47	0
NE	.19	.46	2
ENE	.18	.48	4
E	.27	.59	4
ESE	.33	.61	2
SE	.31	.61	0
SSE	.26	.57	0
S	.27	.57	2
SSW	.32	.57	2
SW	.28	.52	3
WSW	.25	.54	3
W	.19	.56	13
WNW	.22	.60	58
NW	.18	.45	4
NNW	.20	.50	1
N	.19	.50	1

LOCATION 42

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.22	.55	1
NE	.28	.61	9
ENE	.31	.63	12
E	.33	.64	4
ESE	.31	.65	2
SE	.29	.63	0
SSE	.22	.59	0
S	.27	.61	1
SSW	.35	.68	4
SW	.30	.60	4
WSW	.26	.60	4
W	.19	.59	10
WNW	.23	.62	44
NW	.16	.44	1
NNW	.18	.50	0
N	.20	.53	1

1993 PHASE I BUILD CONDITION

LOCATION 40

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.24	.56	2
NE	.23	.51	4
ENE	.20	.49	3
E	.19	.45	0
ESE	.25	.50	0
SE	.29	.58	0
SSE	.40	.80	3
S	.40	.79	14
SSW	.36	.79	21
SW	.22	.50	1
WSW	.17	.52	1
W	.14	.41	0
WNW	.21	.58	40
NW	.20	.51	9
NNW	.17	.43	0
N	.18	.51	1

LOCATION 41

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.51	2
NE	.16	.42	2
ENE	.16	.42	2
E	.23	.50	2
ESE	.25	.50	1
SE	.26	.50	0
SSE	.27	.62	1
S	.31	.61	5
SSW	.26	.56	3
SW	.20	.49	2
WSW	.21	.61	15
W	.15	.47	5
WNW	.21	.55	49
NW	.20	.46	8
NNW	.21	.51	3
N	.21	.49	1

LOCATION 42

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.21	.52	2
NE	.23	.53	9
ENE	.24	.56	12
E	.21	.51	2
ESE	.21	.47	0
SE	.22	.48	0
SSE	.22	.57	1
S	.33	.65	7
SSW	.28	.59	4
SW	.18	.50	3
WSW	.19	.61	16
W	.15	.45	3
WNW	.19	.53	37
NW	.16	.38	1
NNW	.19	.48	1
N	.20	.53	3

2000 FULL-BUILD CONDITION

LOCATION 40

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.15	.40	4
NE	.14	.30	2
ENE	.19	.50	36
E	.27	.56	29
ESE	.20	.50	9
SE	.15	.39	0
SSE	.14	.31	0
S	.13	.27	0
SSW	.13	.23	0
SW	.12	.23	0
WSW	.12	.24	0
W	.13	.25	0
WNW	.13	.25	1
NW	.13	.30	4
NNW	.15	.37	5
N	.16	.42	8

LOCATION 41

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.26	.53	4
NE	.26	.48	8
ENE	.20	.46	7
E	.22	.48	3
ESE	.32	.63	7
SE	.39	.74	6
SSE	.34	.70	4
S	.27	.70	18
SSW	.15	.40	0
SW	.13	.31	0
WSW	.14	.31	0
W	.16	.48	12
WNW	.17	.46	25
NW	.16	.37	3
NNW	.18	.41	0
N	.22	.48	3

LOCATION 42

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.23	.52	3
NE	.23	.52	12
ENE	.20	.56	18
E	.17	.50	3
ESE	.28	.71	13
SE	.38	.72	4
SSE	.37	.73	4
S	.41	.70	16
SSW	.32	.59	8
SW	.23	.51	8
WSW	.15	.37	0
W	.14	.36	0
WNW	.15	.41	8
NW	.17	.29	0
NNW	.14	.30	0
N	.17	.39	0

TABLE C-48

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 43

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.31	.63	4
NE	.34	.65	15
ENE	.36	.65	16
E	.32	.60	3
ESE	.28	.56	1
SE	.30	.60	0
SSE	.24	.62	0
S	.27	.60	2
SSW	.33	.62	2
SW	.31	.58	4
WSW	.30	.60	5
W	.18	.50	3
WNW	.19	.56	26
NW	.22	.56	16
NNW	.19	.50	1
N	.20	.54	1

LOCATION 44

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.29	.60	3
NE	.34	.66	17
ENE	.34	.64	16
E	.28	.60	4
ESE	.26	.55	1
SE	.29	.62	0
SSE	.23	.58	0
S	.28	.58	1
SSW	.31	.59	2
SW	.30	.57	4
WSW	.30	.62	8
W	.20	.53	6
WNW	.17	.53	19
NW	.22	.55	16
NNW	.19	.50	1
N	.22	.56	2

LOCATION 45

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.27	.59	4
NE	.34	.62	17
ENE	.34	.62	17
E	.30	.60	5
ESE	.25	.54	1
SE	.22	.60	0
SSE	.23	.60	1
S	.25	.57	2
SSW	.29	.57	2
SW	.28	.57	7
WSW	.29	.60	10
W	.20	.52	8
WNW	.15	.43	4
NW	.19	.51	15
NNW	.18	.51	2
N	.24	.56	4

1993 PHASE I BUILD CONDITION

LOCATION 43

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.33	.63	8
NE	.32	.59	15
ENE	.28	.54	10
E	.21	.49	1
ESE	.15	.42	0
SE	.18	.45	0
SSE	.23	.56	0
S	.28	.61	4
SSW	.22	.53	1
SW	.17	.44	0
WSW	.17	.48	2
W	.14	.42	1
WNW	.15	.47	13
NW	.16	.41	2
NNW	.25	.64	24
N	.32	.70	18

LOCATION 44

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.25	.60	12
NE	.21	.56	22
ENE	.19	.49	12
E	.17	.42	1
ESE	.14	.35	0
SE	.17	.49	0
SSE	.17	.48	0
S	.20	.50	2
SSW	.17	.43	0
SW	.14	.37	0
WSW	.14	.43	2
W	.14	.37	1
WNW	.15	.43	19
NW	.13	.34	1
NNW	.15	.50	8
N	.22	.60	17

LOCATION 45

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.51	7
NE	.25	.55	29
ENE	.23	.49	17
E	.16	.38	1
ESE	.14	.39	0
SE	.15	.44	0
SSE	.21	.55	2
S	.24	.53	6
SSW	.22	.52	7
SW	.14	.39	2
WSW	.15	.42	3
W	.15	.35	1
WNW	.14	.40	18
NW	.13	.32	2
NNW	.13	.35	0
N	.14	.42	2

2000 FULL-BUILD CONDITION

LOCATION 43

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.27	.64	14
NE	.25	.65	32
ENE	.18	.52	12
E	.19	.56	7
ESE	.23	.62	5
SE	.26	.60	1
SSE	.27	.60	1
S	.27	.54	3
SSW	.20	.49	1
SW	.18	.46	3
WSW	.13	.38	0
W	.12	.29	0
WNW	.12	.25	0
NW	.13	.25	0
NNW	.12	.41	0
N	.21	.66	20

LOCATION 44

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.12	.26	1
NE	.12	.24	4
ENE	.13	.31	17
E	.14	.34	13
ESE	.14	.35	7
SE	.15	.40	4
SSE	.15	.38	3
S	.15	.37	13
SSW	.14	.31	4
SW	.12	.28	6
WSW	.11	.23	1
W	.11	.24	4
WNW	.11	.21	4
NW	.11	.22	5
NNW	.12	.25	1
N	.13	.30	6

LOCATION 45

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.13	.30	0
NE	.14	.38	2
ENE	.28	.55	22
E	.37	.69	29
ESE	.36	.72	19
SE	.32	.73	7
SSE	.25	.67	4
S	.23	.60	10
SSW	.20	.53	5
SW	.15	.38	1
WSW	.14	.36	0
W	.12	.29	0
WNW	.12	.26	0
NW	.12	.28	0
NNW	.12	.26	0
N	.13	.30	0

TABLE C-49

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 46

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.26	.59	2
NE	.36	.64	14
ENE	.36	.64	15
E	.30	.59	3
ESE	.29	.59	1
SE	.19	.59	0
SSE	.23	.62	1
S	.27	.57	1
SSW	.32	.59	1
SW	.32	.59	6
WSW	.33	.68	18
W	.24	.59	13
WNW	.17	.50	11
NW	.16	.49	7
NNW	.22	.55	2
N	.23	.56	2

LOCATION 47

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.27	.57	2
NE	.35	.61	13
ENE	.35	.60	13
E	.30	.57	3
ESE	.33	.65	3
SE	.20	.58	0
SSE	.23	.54	0
S	.29	.55	1
SSW	.32	.58	2
SW	.31	.59	7
WSW	.32	.66	15
W	.25	.60	20
WNW	.16	.47	7
NW	.16	.49	8
NNW	.22	.57	5
N	.22	.54	2

LOCATION 48

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.28	.59	2
NE	.36	.63	14
ENE	.36	.62	12
E	.33	.64	5
ESE	.32	.68	3
SE	.18	.57	0
SSE	.19	.54	0
S	.27	.57	1
SSW	.33	.62	2
SW	.33	.60	7
WSW	.32	.66	14
W	.23	.61	18
WNW	.16	.49	8
NW	.15	.50	7
NNW	.21	.55	2
N	.22	.58	3

1993 PHASE I BUILD CONDITION

LOCATION 46

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.49	6
NE	.27	.51	20
ENE	.25	.49	18
E	.17	.42	2
ESE	.16	.41	1
SE	.19	.54	1
SSE	.20	.51	1
S	.23	.49	4
SSW	.22	.49	5
SW	.19	.41	3
WSW	.18	.46	7
W	.16	.43	11
WNW	.14	.36	7
NW	.13	.30	1
NNW	.17	.44	4
N	.17	.51	9

LOCATION 47

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.20	.58	5
NE	.16	.39	1
ENE	.15	.37	1
E	.16	.42	0
ESE	.17	.43	0
SE	.18	.56	0
SSE	.16	.41	0
S	.17	.40	0
SSW	.15	.38	0
SW	.21	.46	1
WSW	.20	.52	5
W	.20	.54	17
WNW	.20	.56	59
NW	.13	.33	0
NNW	.17	.44	1
N	.20	.62	10

LOCATION 48

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.22	.54	3
NE	.26	.53	9
ENE	.22	.51	8
E	.18	.43	1
ESE	.23	.52	1
SE	.16	.42	0
SSE	.15	.42	0
S	.21	.50	1
SSW	.27	.54	2
SW	.24	.53	6
WSW	.24	.52	5
W	.18	.46	4
WNW	.18	.54	48
NW	.13	.33	0
NNW	.17	.50	3
N	.23	.63	11

2000 FULL-BUILD CONDITION

LOCATION 46

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.37	0
NE	.16	.41	3
ENE	.26	.57	24
E	.27	.69	26
ESE	.29	.73	19
SE	.25	.67	3
SSE	.34	.72	5
S	.34	.63	12
SSW	.24	.54	6
SW	.15	.41	1
WSW	.13	.30	0
W	.13	.29	0
WNW	.13	.29	0
NW	.12	.25	0
NNW	.15	.35	0
N	.16	.37	0

LOCATION 47

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.13	.29	4
NE	.13	.24	4
ENE	.13	.28	11
E	.13	.32	9
ESE	.14	.36	9
SE	.15	.38	3
SSE	.15	.37	3
S	.15	.34	9
SSW	.14	.32	8
SW	.13	.31	17
WSW	.12	.27	5
W	.11	.21	1
WNW	.12	.22	7
NW	.11	.22	4
NNW	.12	.22	0
N	.12	.25	2

LOCATION 48

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.45	1
NE	.18	.50	12
ENE	.24	.54	19
E	.26	.59	12
ESE	.29	.69	14
SE	.22	.61	2
SSE	.19	.55	1
S	.21	.49	2
SSW	.25	.52	4
SW	.20	.47	5
WSW	.20	.54	14
W	.15	.36	1
WNW	.15	.38	5
NW	.14	.39	5
NNW	.14	.33	0
N	.16	.46	2

TABLE C-50

PEDESTRIAN LEVEL WIND TEST DATA

2000 FUTURE NO-BUILD CONDITION

LOCATION 49

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.28	.60	3
NE	.35	.64	16
ENE	.36	.63	15
E	.30	.57	3
ESE	.28	.60	2
SE	.21	.64	0
SSE	.23	.62	1
S	.26	.64	4
SSW	.32	.61	2
SW	.32	.60	8
WSW	.33	.67	16
W	.23	.57	12
WNW	.17	.46	6
NW	.18	.47	5
NNW	.20	.56	3
N	.23	.55	2

LOCATION 50

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.31	.60	2
NE	.36	.65	14
ENE	.35	.66	16
E	.34	.61	3
ESE	.30	.59	1
SE	.30	.61	0
SSE	.21	.58	0
S	.26	.61	2
SSW	.35	.63	2
SW	.33	.61	6
WSW	.33	.63	8
W	.23	.59	11
WNW	.19	.54	17
NW	.23	.55	13
NNW	.20	.50	0
N	.20	.55	1

LOCATION 51

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.32	.79	6
NE	.39	.83	23
ENE	.39	.78	18
E	.34	.71	4
ESE	.22	.57	0
SE	.23	.59	0
SSE	.31	.68	0
S	.33	.73	3
SSW	.20	.51	0
SW	.22	.51	0
WSW	.16	.40	0
W	.19	.52	1
WNW	.31	.66	29
NW	.28	.63	13
NNW	.19	.53	0
N	.32	.72	4

1993 PHASE I BUILD CONDITION

LOCATION 49

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.23	.51	4
NE	.28	.53	15
ENE	.24	.50	12
E	.17	.41	1
ESE	.16	.38	0
SE	.17	.47	0
SSE	.22	.57	1
S	.25	.55	4
SSW	.26	.57	7
SW	.22	.54	15
WSW	.22	.51	8
W	.17	.44	6
WNW	.16	.44	19
NW	.14	.35	1
NNW	.16	.41	1
N	.17	.50	4

LOCATION 50

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.32	.63	8
NE	.36	.66	26
ENE	.31	.61	18
E	.23	.49	1
ESE	.16	.40	0
SE	.17	.44	0
SSE	.24	.56	0
S	.29	.64	6
SSW	.27	.55	2
SW	.21	.53	5
WSW	.19	.48	2
W	.15	.39	0
WNW	.16	.45	8
NW	.15	.46	8
NNW	.20	.56	8
N	.25	.61	8

LOCATION 51

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.28	.68	4
NE	.37	.76	23
ENE	.33	.71	17
E	.33	.66	4
ESE	.20	.50	0
SE	.17	.46	0
SSE	.20	.55	0
S	.19	.50	0
SSW	.19	.51	0
SW	.21	.47	0
WSW	.18	.44	0
W	.19	.48	1
WNW	.30	.64	40
NW	.21	.54	7
NNW	.19	.55	1
N	.29	.62	2

2000 FULL-BUILD CONDITION

LOCATION 49

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.19	.57	11
NE	.17	.42	5
ENE	.23	.48	12
E	.23	.51	6
ESE	.21	.58	6
SE	.27	.68	5
SSE	.27	.70	5
S	.25	.57	7
SSW	.23	.55	7
SW	.19	.48	7
WSW	.15	.39	1
W	.15	.36	1
WNW	.15	.33	2
NW	.14	.32	1
NNW	.19	.49	9
N	.19	.58	15

LOCATION 50

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.16	.41	1
NE	.17	.47	8
ENE	.31	.57	24
E	.23	.50	4
ESE	.16	.44	0
SE	.17	.50	0
SSE	.28	.64	3
S	.26	.57	6
SSW	.25	.54	5
SW	.21	.48	6
WSW	.17	.54	15
W	.14	.42	4
WNW	.14	.35	3
NW	.13	.31	0
NNW	.16	.45	2
N	.21	.60	15

LOCATION 51

WIND ANGLE	RATIOS MEAN	RATIOS GUST	WEIGHT (ANNUAL)
NNE	.28	.69	4
NE	.38	.80	28
ENE	.26	.65	11
E	.31	.64	3
ESE	.20	.56	0
SE	.17	.40	0
SSE	.16	.41	0
S	.19	.49	0
SSW	.19	.47	0
SW	.21	.47	0
WSW	.17	.43	0
W	.19	.50	1
WNW	.29	.63	35
NW	.22	.58	13
NNW	.19	.52	0
N	.28	.62	3

TABLE C-51

PEDESTRIAN LEVEL WIND TEST DATA

APPENDIX J

EXCAVATED SOIL MATERIAL MANAGEMENT PLAN

SECTION 02220

EXCAVATED SOIL MATERIAL MANAGEMENT PLAN

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Materials encountered in the excavation shall be handled in a manner which complies with applicable federal, state and local laws and regulations and with the procedures described in these Specifications.

B. It is planned to reuse suitable excavated material on-site. The Contractor shall refer to Specification Section 02200 - Earthwork for material criteria as well as backfill use and placement requirements.

C. The Owner will provide on-site monitoring of excavated materials to determine the requirements for stockpiling, handling, and testing of the excavated material for the purpose of determining its suitability for on-site reuse or disposition for off-site disposal/treatment.

D. The Contractor shall store excavated material in designated stockpile or impoundment areas as described herein. The Contractor shall not remove any excavated materials from the site for disposal or treatment without a DEP approved Bill of Lading or manifest.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 EXCAVATION

A. The potential exists for encountering contaminated material during excavation. The contractor shall excavate material by

methods which will permit observation of exposed subsurface soils to reduce the potential for mixing visually contaminated soils with visually uncontaminated soils.

B. The Contractor shall excavate beyond the limits of the excavation, when directed, to remove localized areas of stained soil which indicate visual, olfactory or field screening evidence of contamination.

3.02 EXCAVATED MATERIAL CLASSIFICATION FOR ON-SITE REUSE

A. Excavated material will ultimately be classified into five main groups and stockpiled separately, based on the results of the Geotechnical Engineer's field observations and HNU screening during excavation and subsequent field or laboratory analytical testing for total petroleum hydrocarbons (TPH), if necessary. Group I and II materials are considered suitable for on-site reuse. Groups III and IV materials are not suitable for on-site reuse. Analytical testing will be performed on soils that indicate visual or olfactory evidence of contamination or soils that indicate HNU readings greater than 10 ppm.

Material Suitable for Unrestricted Reuse

- Group I: Soils which do not indicate visual or olfactory evidence of contamination and where field screening indicates background HNU readings . Visually uncontaminated soils not excavated from an area of known or suspected contamination will not be analytically tested for on-site reuse.

Material Suitable for Restricted Reuse Based on Chemical Testing Results:

- Group II: Soils which indicate visual or olfactory evidence of contamination (light staining) where TPH concentrations are below the level allowable for on-site reuse as backfill and where field screening indicates HNU readings less than 10 ppm.

Material Not Suitable for On-Site Reuse:

- Group III: Soils which indicate visual or olfactory evidence of contamination (moderate staining) where TPH

concentrations exceed the levels allowable for on-site reuse as backfill or soils which exhibit HNU readings greater than 10 ppm and less than 100 ppm.

- o Group IV: Soils which indicate visual or olfactory evidence of contamination (heavy staining) where TPH concentrations would classify the material as a Hazardous Material or soils which exhibit HNU readings greater than or equal to 100 ppm.

- o Group V: Solid waste from buried foundation remnants or other structures such as granite blocks, bricks and other demolition or construction debris.

B. The criteria for group classification is shown graphically on Table I.

C. Group III and IV stockpiles will be sampled and analytical tested to determine its disposition for off-site disposal or treatment (See paragraph 3-07 herein).

D. Treatment Option for Reuse of Oil Contaminated Soils

Group II, III or IV soils (Petroleum Contaminated Soils) may be eligible for on-site or off-site treatment by incorporation into an asphalt emulsion mixture using a pugmill process. The resulting "asphalt batched" material could be reused as roadway subbase material. A determination as to the applicability of the pugmill treatment process will be made during construction based on the amount of Group II, III or IV soils encountered and the results of additional chemical testing.

3.03 SOIL QUALITY MONITORING

A. Visual and Olfactory Criteria: Excavated soils will be monitored by the Geotechnical Engineer for visual and olfactory evidence of contamination, including discoloration, texture, odor, etc.

- o If material does not indicate evidence of oil staining, does not exhibit discoloration or unnatural odor the soil will be classified as Group I soils and stockpiled on-site for reuse as backfill material.

- If material has light staining, no discolorations, has a slight petroleum or other odor or has other indications of contamination, the excavated material will be stockpiled at an intermediate location and field screened for TPH using a portable laboratory analyzer or sent to a laboratory for analytically testing. Material will be classified into Group II or III based on the TPH test results and moved from the intermediate stockpile to the appropriate Group stockpile.

- If material has moderate staining and odor, is discolored or has other indications of contamination the material will be classified as Group III soils and stockpiled for sampling and analytical testing to determine its disposition for off-site disposal or treatment (See paragraph 3-07 herein).

- If material exhibits heavy staining, is unusually discolored, has a strong odor or contains unidentified waste indicating evidence of contamination which may be hazardous, the material will be classified as Group IV soils and stockpiled for sampling and analytical testing to determine its disposition for off-site disposal or treatment (See paragraph 3-07 herein).

B. HNU Screening Criteria: In conjunction with visual and olfactory monitoring, excavated material will be monitored with an HNU photoionization detector (screened) to determine the relative concentration of volatile organic compounds (VOCs). Screening will occur in the excavation area (ambient) and will be periodically performed in jar sample headspace. Ambient HNU readings will be performed in the work zone and within 6 inches of the excavated material. Material will be classified based on HNU readings as follows:

- Group I - background
- Group II - less than 10 ppm
- Group III - 10 to 100 ppm
- Group IV - greater than 100 ppm

If material has HNU readings greater than 10 ppm, laboratory chemical testing will be performed for disposition of the material for off-site disposal or treatment (See paragraph 3.07 herein)

C. Materials classified as Group V (solid waste) shall be

stockpiled separately from other materials and will not be subject to analytical testing to determine disposition of the soil for off-site disposal.

3.04 HEALTH AND SAFETY/RIGHT-TO-KNOW

A. All contractors are required to notify their workers of the history of the site and contaminants that may be present, and to be alert for evidence of contaminated soils. The Geotechnical Engineer (Haley & Aldrich, Inc.) should be notified of the presence of potentially hazardous conditions, if encountered.

B. All contractors will be required to prepare a Health and Safety Plan for their workers at the site. It may be necessary that workers who are in close proximity to excavated materials be trained in Health and Safety procedures according to the OSHA requirements and be current in their OSHA refresher course.

3.05 SOIL/EXCAVATED MATERIAL STOCKPILING

A. Excavated material classified as Group I material according to the visual, olfactory and HNU screening criteria may be moved directly into the construction area for reuse as backfill or stockpiled.

B. Excavated material classified as Group II material according to the visual, olfactory and HNU screening criteria will be temporarily stockpiled in intermediate areas for subsequent TPH testing. The stockpile shall be located away from the on-going construction activity, pending the results of the on-site or off-site laboratory analyses. Once the material is classified into a Group II, III or IV based on the results of the TPH testing it may be moved directly into the construction area if suitable for reuse (Group II) or temporarily stockpiled into "Group" stockpiles.

C. Intermediate or "Group" stockpiles of visually contaminated material (Groups II, III) should be placed on polyethylene plastic and securely covered with polyethylene.

D. Group IV material (hazardous material) shall be stored in a separate impoundment area within a perimeter of concrete

Jersey barriers, lined with 20-mil polyethylene and securely covered with 20-mil polyethylene. This area shall be secured with a fence and identified as a "resticted area" to prevent contact with the material.

3.06 USE OF GROUP I AND II MATERIAL

A. Not all material meeting the environmental criteria for classification as Group I or II material will be suitable for reuse on-site. The use of Group I and II material is also dependent on the geotechnical classification of the soil as follows:

- Group I soil which conforms to the requirements of "common fill" in Specification Section 02200 - Earthwork is suitable for reuse inside or outside the building limits, where common fill is specified.

- Group II soil which does conform to the requirements of "common fill" is restricted to use in areas outside the building (exterior of the perimeter grade beams) where common fill is specified. Group II soils shall be covered with a minimum of 12 inches of Group I material or clean off-site material conforming to Group I criteria.

- Group I and II soil which does not conform to the requirements of "common fill" is restricted for use in landscaped areas only, where common fill is called for.

B. Excavated material is anticipated to contain varoius amounts of unsuitable material such as building debris, wood, concrete etc. The Contractor shall be prepared to mobilize equipment necessary to remove this material from the soil (mechanical screening). The contractor may elect to process (crush) the screened material or solid waste such as concrete and granite blocks for on-site reuse. The suitability of the processed material for reuse will be determined by the Geotechnical Engineer.

3.07 DISPOSITION OF EXCESS MATERIAL FOR OFF-SITE DISPOSAL OR TREATMENT

A. All soil (Groups I through IV) that cannot be reused on site

will be subject to chemical testing (performed by the Owner) and characterized prior to leaving the site.

B. Primary chemical testing for all Groups will include Volatile Organic Compounds (EPA 8240), Total Metals (EPA 7000), Total Petroleum Hydrocarbons (EPA 418.1 or GC/FID).

The minimum frequency of primary sampling and testing will be as follows:

- Group I - one sample every 500 cu. yds.
- Group II - one sample every 100 cu. yds.
- Group III - one sample every 50 cu. yds.
- Group IV - one sample every 20 cu. yds.

C. Secondary chemical testing consisting of Toxicity Characteristic Leaching Procedure (TCLP) for RCRA 8 metals will be required where total metals exceed 500 ppm for lead and 20 times the TCLP criteria for other metals. Hydrocarbon Fingerprinting by GC/FID - Modified ASTM Method D3328 will be performed where TPH exceeds 500 ppm. The frequency of secondary testing will be performed on one sample every 500 cu. yds. Other testing will be required for recycling or disposal to out-of-state landfills.

D. Based on the chemical testing soil will be classified into the following types for purposes of off-site disposal or treatment according to criteria established by the DEP as outlined in Table II attached.

1. Unregulated Soil: Soil which is below DEP criteria for De Minimus levels of contamination.

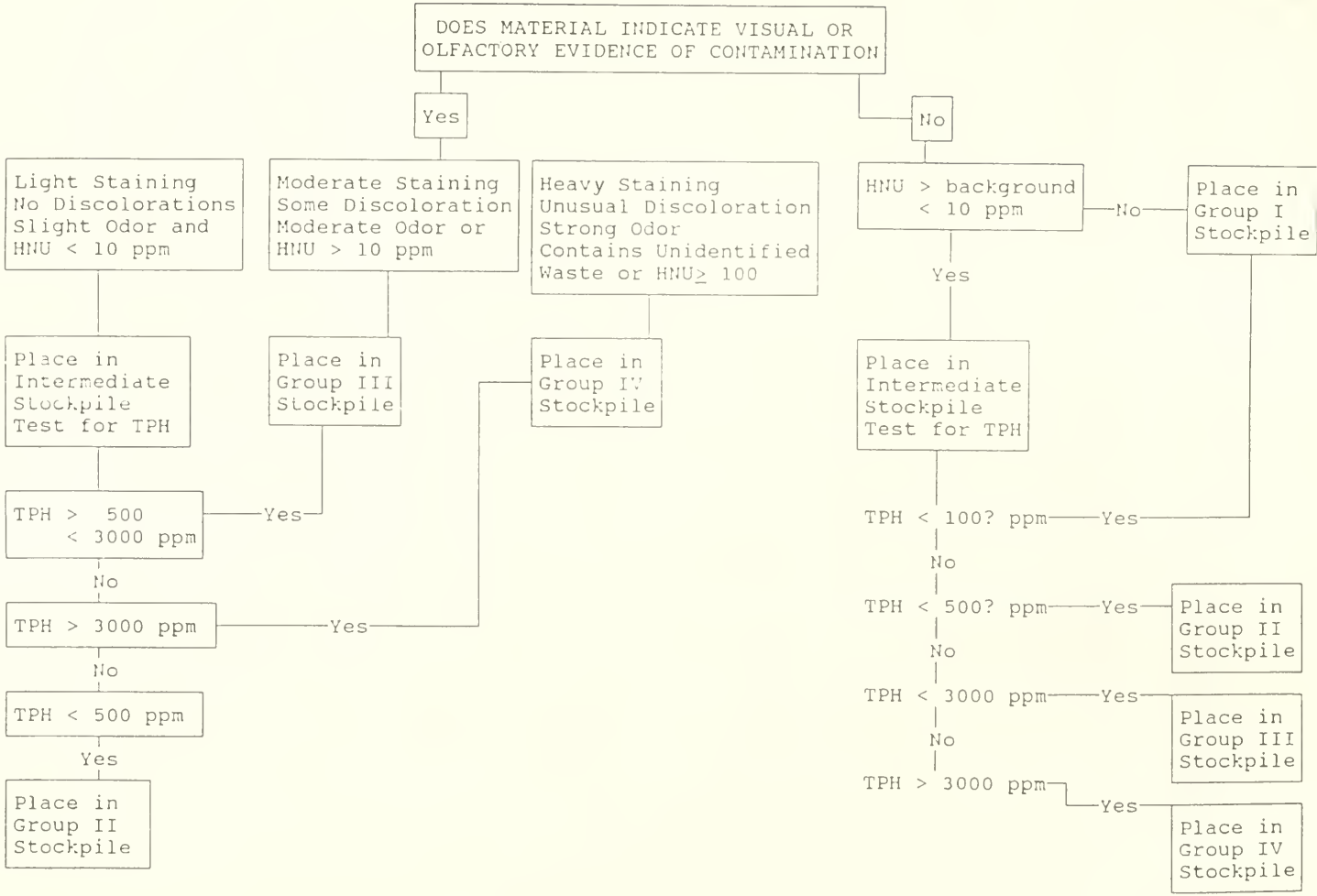
2. Regulated Soil (aka Urban Fill): Excavated material which exceeds DEP De Minimus criteria, containing low levels of contamination consistent with contamination levels present in near surface soils in urban areas. Urban fill will most likely be used as daily cover at an in-state landfill or eligible for treatment (recyled).

3. Hazardous Material: Moderately contaminated fill material (i.e. greater than 3,000 ppm total petroleum hydrocarbons, TPH) will likely require treatment (in-state or out-of-state) or out-of-state disposal in a secure landfill.

TABLE I

EXCAVATED MATERIAL CLASSIFICATION FOR ON-SITE REUSE

PARCEL B - SOUTH END TECHNOLOGY SQUARE
BOSTON, MASSACHUSETTS



4. Hazardous Waste: Material which exceeds TCLP maximum allowable criteria will require removal to an out-of-state approved hazardous waste disposal or treatment facility.

5. Solid Waste - Solid waste such as granite blocks, bricks, concrete shall be disposed of in a DEP approved solid waste landfill or, if possible, processed (recyled) into usable on-site material (Group V).

E. Options for off-site disposal or treatment of contaminated soils will be determined during construction based on the chemical testing results and discussions with DEP Solid Waste.

F. The Contractor shall be responsible for proper disposal of materials leaving the site in accordance with applicable Federal and State and Local laws.

3.08 TRANSPORTATION OF EXCAVATED MATERIAL

A. Materials removed from the site shall be loaded onto trucks within the site limits. All trucks leaving the site shall be covered and cleaned of spilled debris that might fall from the trucks during transport.

B. All material removed from the site is subject to documentation requirements stating destination and quantity and authorization from DEP Division of Solid Waste. Bills of Lading issued by the DEP will be necessary for off-site disposal.

3.09 DEWATERING/SEDIMENTATION CONTROL

A. Groundwater is not expected to be encountered during foundation construction, except in local excavations for utilities, oil and grease separator or for obstruction removal. However, surface water from rainfall and runoff or drill water from pile pre-augering will collect in the pile cap excavations and require pumping for construction in-the-dry. The collected water will require sedimentation control devices and storage into an on-site holding tank prior to discharge to the nearby storm drainage system. The sedimentation control system will require the use of two

settlement basins connected by pipes to remove fines prior to discharge. The Contractor shall design the sedimentation control system in accordance with the criteria given in the permit submittal prepared by the Geotechnical Engineer on behalf of the Owner and install it according to the submitted shop drawings.

B. Water collected in the holding tank will be subject to chemical testing prior to discharge. The Contractor shall not discharge the water in the storm drains without reviewing the chemical testing results to determine compliance with discharge limitations given in the permits.

C. The Owner will submit documentation to the EPA and to the City of Boston necessary to obtain the permits required for discharge into the storm drains. The Contractor shall be responsible for compliance with the conditions stated in the permits. Chemical testing performed by the owner does not release the Contractor from this responsibility.

3.10 DUST CONTROL

A. The Contractor shall employ dust control measures to minimize the creation of airborne dust during the entire construction process. As a minimum, standard dust control techniques shall be employed where heavy equipment will be traveling such as watering-down the site or spreading hygroscopic salts.

B. Existing asphalt should be left in-place where possible outside the building area to reduce dust.

3.11 CONTINGENCIES

A. If during the work, the presence of potentially hazardous conditions is evident, work in the area shall be terminated. These conditions include, but are not limited to, encountering buried containers, drums or tanks.

B. The area will be secured to prevent the existence of a health risk or release into the environment. The sources of the event causing the material to be considered suspect will be determined by the Geotechnical Engineer. In the event that buried containers, drums or tanks are encountered or if a

release of oil or potentially hazardous materials has occurred, the Contractor shall notify DEP Incident Response. The City of Boston Fire Department and state Fire Marshal's office must be notified prior to removal of buried storage tanks.

C. The impact on the work should be evaluated and, if necessary, a Health and Safety Program will be established for workers in the area.

END OF ESMMP

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TABLE II

ESMMP OFF-SITE SOIL DISPOSAL CRITERIA

PROPOSED CENTER FOR ADVANCED BIOMEDICAL RESEARCH (PARCEL B)
SOUTH END TECHNOLOGY SQUARE
BOSTON, MASSACHUSETTS

UNREGULATED MATERIAL

- o PID Headspace VOCs ≤ 1 ppm (vol/vol)
- o TPH (EPA Method 418.1) ≤ 100 ppm
- o Other Parameters, if analyzed, at or below "DeMinimus" levels
- o No visual/olfactory evidence of contamination

REGULATED SOIL - IN-STATE UNLINED LANDFILL

- o PID Headspace VOCs ≤ 100 ppm(v/v)
- o TPH (EPA 418.1) ≤ 1000 ppm
- o No significant visual/olfactory evidence of contamination

	"Deminimus" Concentrations
o Total Halogenated VOCs(EPA 8240)	≤ 4 ppm
o Total Metals (EPA 6010/7000 Series)	
- Arsenic	≤ 40 ppm
- Cadmium	≤ 5 ppm
- Chromium	≤ 100 ppm
- Lead	≤ 1000 ppm
- Mercury	≤ 2 ppm

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TABLE II (Continued)

ESMMP OFF-SITE SOIL DISPOSAL CRITERIA

PROPOSED CENTER FOR ADVANCED BIOMEDICAL RESEARCH (PARCEL B)
SOUTH END TECHNOLOGY SQUARE
BOSTON, MASSACHUSETTS

REGULATED SOIL - IN-STATE LINED LANDFILL

o	PID Headspace VOCs	≤ 1800 ppm(v/v)
o	TPH (EPA 418.1)	≤ 3000 ppm
		"Deminimus" Concentrations
o	Total Halogenated VOCs(EPA 8240)	≤ 4 ppm
o	Total Metals (EPA 6010/7000 Series)	
	- Arsenic	≤ 40 ppm
	- Cadmium	≤ 5 ppm
	- Chromium	≤ 100 ppm
	- Lead	≤ 1000 ppm
	- Mercury	≤ 2 ppm

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TABLE II (Continued)

ESMMP OFF-SITE SOIL DISPOSAL CRITERIA

PROPOSED CENTER FOR ADVANCED BIOMEDICAL RESEARCH (PARCEL B)
SOUTH END TECHNOLOGY SQUARE
BOSTON, MASSACHUSETTS

ASPHALT BATCHING/RECYCLING (Petroleum-Contamination)

o	PID Headspace VOCs	≤ 1800 ppm (v/v)
o	TPH (EPA 418.1)	≤ 3000 ppm (rotary kiln) to ≤60000 ppm (asphalt emulsion)*
o	VOCs (EPA 8240)	
	- BTEX	≤ 5 ppm
	- Halogenated VOCs	ND to ≤ 5 ppm *
o	Total Metals (EPA 6010/7000 Series)	
	- Arsenic	≤ 100 ppm
	- Cadmium	≤ 20 ppm
	- Chromium	≤ 100 ppm
	- Lead	≤ 1000 ppm
	- Mercury	≤ 4 ppm
o	TCLP RCRA 8 Metals	
	- Arsenic	< 5 ppm
	- Barium	< 100 ppm
	- Cadmium	< 1 ppm
	- Chromium	< 5 ppm
	- Lead	< 5 ppm
	- Mercury	< 0.2 ppm
	- Selenium	< 1 ppm
	- Silver	< 5 ppm
o	PCBs (EPA Method 8080)	< 1 ppm to 10 ppm*
o	pH (EPA Method 5.2)	2 < pH < 12.5
o	Flash Point (ASTM D-93-79/80 or D-3278-78)	> 140°F

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TABLE II (Continued)

ESMMP OFF-SITE SOIL DISPOSAL CRITERIA

PROPOSED CENTER FOR ADVANCED BIOMEDICAL RESEARCH (PARCEL B)
SOUTH END TECHNOLOGY SQUARE
BOSTON, MASSACHUSETTS

ASPHALT BATCHING/RECYCLING (Petroleum-Contamination)

o	Reactivity	
	- Sulfide (EPA Method 9010)	< 500 mg H_2S/kg Waste
	- Cyanide (EPA Method 9030)	< 250 mg HCN/kg Waste
o	Total Cyanide (EPA 9010)	ND
o	Paint Filter Test	No Free Liquid
o	Sieve	< 15 % passing No. 200 sieve

Notes: * specific level depends on facility license
ND indicates non-detectable concentration

TABLE II (Continued)

ESMMP OFF-SITE SOIL DISPOSAL CRITERIA

PROPOSED CENTER FOR ADVANCED BIOMEDICAL RESEARCH (PARCEL B)
SOUTH END TECHNOLOGY SQUARE
BOSTON, MASSACHUSETTS

OUT-OF-STATE LANDFILL/FACILITY

	Non-Hazardous Waste RCRA Subtitle D	RCRA Characteristic Hazardous Waste RCRA Subtitle C
o PID Headspace VOCs	No Criteria	No Criteria
o TPH (EPA 418.1)	No Criteria	No Criteria
o VOCs (EPA 8240)	No Criteria	No Criteria
o TCLP RCRA 8 Metals		
- Arsenic	< 5 ppm	≥ 5 ppm
- Barium	< 100 ppm	≥ 100 ppm
- Cadmium	< 1 ppm	≥ 1 ppm
- Chromium	< 5 ppm	≥ 5 ppm
- Lead	< 5 ppm	≥ 5 ppm
- Mercury	< 0.2 ppm	≥ 0.2 ppm
- Selenium	< 1 ppm	≥ 1 ppm
- Silver	< 5 ppm	≥ 5 ppm
o TCLP Other Metals		
- Copper	< 100 ppm	≥ 100 ppm
- Nickel	< 200 ppm	≥ 200 ppm
- Zinc	< 500 ppm	≥ 500 ppm
o TCLP Volatile Organic Compounds		
- Benzene	< 0.5 ppm	≥ 0.5 ppm
- Chlorobenzene	< 100 ppm	≥ 100 ppm
- 1,2-Dichloroethane	< 0.5 ppm	≥ 0.5 ppm
- Methyl Ethyl Keytone	< 200 ppm	≥ 200 ppm
- Trichloroethylene	< 0.5 ppm	≥ 0.5 ppm
- Carbon Tetrachloride	< 0.5 ppm	≥ 0.5 ppm
- Chloroform	< 6 ppm	≥ 6 ppm
- 1,1-Dichloroethylene	< 0.7 ppm	≥ 0.7 ppm
- Tetrachloroethylene	< 0.7 ppm	≥ 0.7 ppm
- Vinyl Chloride	< 0.2 ppm	≥ 0.2 ppm

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HALEY & ALDRICH INC.

Geotechnical Engineers &
Environmental Consultants

15 August 1991
File No. 10666-44

RECEIVED
1 9 1991
VIA COURIER

Robert F. Walsh Associates
307 West First Street
South Boston, Massachusetts 02127

Attention: Mr. Robert F. Walsh

Subject: Special Considerations Related to Foundation Construction
South End Technology Square (SETS)
Boston, Massachusetts

Gentlemen:

As discussed in our geotechnical evaluations, the presence of the existing seawalls from the former Roxbury Canal and the Roxbury Canal Conduit will present special design and construction issues for proposed buildings which are constructed directly over or near these buried structures. The purpose of this letter is to identify the issues involved and describe the impacts on the proposed design and construction. The approximate location of the seawall and the conduit as encountered in the test pits is shown on Figure 2 in the geotechnical report for the proposed garage.

The buried seawalls, located along the southern end of the SETS site consist of dry laid and mortared granite blocks supported on wood piles driven into the inorganic marine clay below the fill and organic soil. The walls were designed as gravity retaining walls and therefore are constructed with a base width which is approximately 1/2 the wall height. Given the size of the buried seawall it will be impractical to remove the wall; therefore any new pile foundations will have to be located outside the lateral limits of the wall.

The Roxbury Canal Conduit is a concrete box culvert located about 20 ft. south of the seawall. The conduit was constructed within the limits of the former Roxbury Canal to convey storm drainage water to the Fort Point Channel. According to record drawings the conduit is approximately 21 ft. wide and is supported by wood

piles. The top of the conduit is located approximately 5 ft. below the ground surface. Any new pile foundations would have to be located outside the plan limits of the conduit. The site constraints imposed by the conduit also include considerations for construction within a drainage easement.

Any proposed columns which are located within the limits of the seawall or conduit will need to be supported on heavy structural grade beams which span across the buried structures and connect to pile cap constructed outside the plan limits of the existing structures. It is possible that the top of the conduit would constrain the depth of the grade beam thus impacting the design finished floor grades. There would be premium costs for support of such columns due to extra piles and concrete beams needed to support the eccentric loading.

Construction issues related to pile driving in the area of the seawall or the conduit would include the increased potential for encountering obstructions, especially behind the seawall where backfilling typically consists of stone rip-rap or large stone sizes. Stray wood piles or horizontal wood cribbing may be encountered near the base of the wall or in the area between the seawall and the conduit. The potential for encountering obstructions adjacent to the wall on the former canal side is also great due to backfilling procedures where larger stones are typically pushed up against the wall. Encountering obstructions during pile driving can result in extra costs associated with replacement of broken piles or for added piles, pile cap enlargement and redesign.

In addition, pile driving adjacent to the canal would require predrilling and vibration monitoring during construction to protect the conduit structure.

If you have any question please contact us.

Sincerely yours
HALEY & ALDRICH, INC.

Keith E. Johnson
Senior Engineer

Edmund G. Johnson
Senior Vice President

KEJ:EGJ:setsa10

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